Farming, Fishing, Forestry, and Transportation Occupations

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Occupations Included in this Reprint

Agricultural Workers

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Significant Points

- Farmworkers comprise 9 out of 10 agricultural workers.
- Duties and working conditions vary widely, from working in nurseries, to producing crops and raising livestock outdoors, to inspecting agricultural products in plants.
- Most workers learn through short-term on-the-job training; agricultural inspectors need work experience or a college degree in a related field.
- Employment is projected to grow more slowly than average.

Nature of the Work

Agricultural workers have a range of responsibilities, from planting, cultivating, grading, and sorting agricultural products to inspecting agricultural commodities and facilities. They may work with food crops, animals, or trees, shrubs, and plants. Depending on their jobs, they may work outdoors or indoors.

Agricultural inspectors are employed by Federal and State governments to inspect agricultural commodities, processing equipment and facilities, and fish and logging operations for compliance with laws and regulations governing health, quality, and safety. They inspect horticultural products or livestock to detect harmful disease or infestations. To assist in eradicating disease, they also inspect livestock to help determine the effectiveness of medication and feeding programs. They may collect samples of pests, or of suspected diseased animals or materials, and send such samples to a laboratory for identification and analysis.

Graders and sorters, agricultural products work to ensure the quality of the agricultural commodities that reach the market. They grade, sort, or classify unprocessed food and other agricultural products by size, weight, color, or condition.

Farmworkers and laborers, crop, nursery, and greenhouse manually plant, maintain, and harvest food crops; apply pesticides, herbicides, and fertilizers to crops; and cultivate the plants used to beautify landscapes. They prepare nursery acreage or greenhouse beds for planting; water, weed, and spray trees, shrubs, and plants; cut, roll, and stack sod; stake trees; tie, wrap, and pack flowers, plants, shrubs, and trees to fill orders; and dig up or move field-grown and containerized shrubs and trees. Additional duties include planting seedlings, transplanting saplings, and watering and trimming plants.

Farmworkers, farm and ranch animals care for live farm, ranch, or aquacultural animals that may include cattle, sheep, swine, goats, horses and other equines, poultry, finfish, shellfish, and bees. They also tend to animals raised for animal products, such as meat, fur, skins, feathers, eggs, milk, and honey. Duties may include feeding, watering, herding, grazing, castrating, branding, de-beaking, weighing, catching, and loading animals. They also may maintain records on animals, examine animals to detect diseases and injuries, and assist in birth deliveries and administer medications, vaccinations, or insecticides as appropriate. Daily duties include cleaning and maintaining animal housing areas.

Farmworkers, agricultural production may have a wide range of duties, some of which overlap duties of other farmworkers described above. They tend to livestock and poultry; plant and harvest crops; and apply pesticides, herbicides, and fertilizers to crops. These farmworkers also repair farm buildings and fences. Other duties may include operating milking machines and other dairy processing equipment, supervising seasonal help, irrigating crops, and hauling livestock products to market. Some farmworkers operate tractors, fertilizer spreaders, haybines, raking equipment, balers, combines, threshers, and other equipment used for plowing, sowing, and harvesting. They also may help with the sorting, storage, and working in post-harvest treatment of crops.

On dairy farms, agricultural workers milk cows two or three times a day.

Working Conditions

Working conditions vary widely. For example, some inspectors do field work, and may travel frequently. Federal food inspectors may work in highly mechanized plants or with poultry or livestock in confined areas with extremely cold temperatures and slippery floors. The duties often require working with sharp knives, moderate lifting, and walking or standing for long periods. Many inspectors work long and often irregular hours. Inspectors may find themselves in adversarial roles when the organization or individual being inspected objects to the inspection process or its potential consequences.

Graders and sorters may work with similar products for an entire shift, or may be assigned a variety of items. They may be on their feet all day and may have to lift heavy objects, whereas others may sit during most of their shift and do little strenuous work. Some graders work in clean, air-conditioned environments, suitable for

carrying out controlled tests. Some may work evenings or weekends because of the perishable nature of the products. Overtime may be required to meet production goals.

For farmworkers in nurseries, work is seasonal; spring and summer are the busier times of the year and hours in the cold weather tend to be fewer. These workers enjoy relatively comfortable working conditions while tending to plants indoors. However, during the busy seasons when landscape contractors need plants, work schedules may be more demanding, requiring weekend work. Moreover, the transition from warm weather to cold weather means that nursery workers might have to work overtime with little notice in order to move plants indoors in case of a frost.

Farmworkers enjoy a somewhat independent lifestyle working with animals or on the land. Benefits include the wide-open physical expanse, the variability of day-to-day work, and the rural setting. However, hours are generally uneven and often long; work cannot be delayed when crops must be planted and harvested, or when animals must be sheltered and fed. Weekend work is common, and farmworkers may work a 6- or 7-day week during planting and harvesting seasons. About 1 out of 5 agricultural workers had variable schedules, compared with fewer than 1 in 10 workers in all occupations combined. As much of the work is seasonal in nature, many workers also obtain other employment. Migrant farmworkers, who move from location to location as crops ripen, live an unsettled lifestyle, which can be stressful.

Much farm and ranch work takes place outdoors in all kinds of weather and is physical in nature. Harvesting fruits and vegetables, for example, may requiremuch bending, stooping, and lifting. Some field workers may lack adequate sanitation facilities, and their drinking water may be limited. The year-round nature of much livestock production work means that ranch workers must be out in the heat of summer, as well as the cold of winter. Those who work directly with animals risk being bitten or kicked.

Farmworkers in crop production risk exposure to pesticides and other potentially hazardous chemicals that are sprayed on crops or plants. However, exposure is relatively minimal if safety procedures are followed. Those who work on mechanized farms must take precautions when working with tools and heavy equipment to avoid injury.

Employment

Agricultural workers held 987,000 jobs in 2000. Farmworkers held 909,000 jobs, graders and sorters 63,000 jobs, and agricultural inspectors 15,000 jobs. More than 60 percent of all agricultural workers held jobs in crop and livestock production and almost 21 percent held jobs in agricultural services, mostly for farm labor contractors. About 15 percent of farmworkers were part-time employees, about the same proportion as for workers overall.

Training, Other Qualifications, and Advancement

Becoming an agricultural inspector requires relevant work experience, or a college degree in a field such as biology or agricultural science. Inspectors are trained in the applicable laws or inspection procedures through some combination of classroom and on-the-job training. In general, people who want to enter this occupation should be responsible, like detailed work, and be able to communicate well. Federal Government inspectors whose job performance is satisfactory advance through a career ladder to a specified full-performance level. For positions above this level, usually supervisory positions, advancement is competitive and based on agency needs and individual merit. Advancement opportunities in State and local governments and in the private sector are often similar to those in the Federal Government.

For graders and sorters, training requirements vary on the basis of their responsibilities. For those who perform tests on various agricultural products, a high school diploma is preferred and may be required. Simple jobs may be filled by beginners provided with short-term on-the-job training.

Farmworkers learn through short-term on-the-job training. Fifty-six percent of these workers do not have a high school diploma, compared with only about 13 percent of all workers in the economy. The proportion of workers without a high school diploma is particularly high in the crop production sector, where there are more labor-intensive establishments employing migrant farmworkers.

In nurseries, entry-level workers must be able to follow directions and learn proper planting procedures. If driving is an essential part of a job, employers look for applicants with a good driving record and some experience driving a truck. Workers who deal directly with customers must get along well with people. Employers also look for responsible, self-motivated individuals, because nursery workers sometimes work with little supervision.

Advancement depends on motivation and experience. Farmworkers who work hard and quickly, have good communication skills, and take an interest in the business may advance to crew leader or other supervisory positions. Some agricultural workers may aspire to become farm, ranch, and other agricultural managers, or farmers or ranchers themselves. (Farmers, ranchers, and agricultural managers are discussed in a separate *Handbook* statement.) In addition, their knowledge of raising and harvesting produce may provide an excellent background for becoming purchasing agents and buyers of farm products. Knowledge of working a farm as a business can help agricultural workers become farm and home management advisors. Those who earn a college degree in agricultural science could become agricultural and food scientists.

Job Outlook

Overall employment of agricultural workers is projected to grow more slowly than the average for all occupations over the 2000-10 period—primarily reflecting the outlook for farmworkers, who constitute 9 out of 10 agricultural workers. Low wages, the physical demands of the work, and high job turnover should result in abundant job opportunities.

Continued consolidation of farms and technological advancements in farm equipment will dampen employment growth. Nevertheless, farms remaining in operation will still need workers to help with farms' operations, and farm labor contractors' employment of farmworkers is expected to increase rapidly. Farmworkers in landscape and horticultural services should have among the most rapid job growth, reflecting the demand for agricultural services such as landscaping.

Slower-than-average employment growth also is expected for agricultural inspectors, as governments at all levels are not expected to hire significant numbers of new inspectors and regulators. Similarly, slow growth is expected for graders and sorters, reflecting projections for the industries in which they work.

Earnings

Median weekly earnings of farmworkers were $309 in 2000. The middle 50 percent earned between $250 and $404. The lowest 10 percent earned less than $205, and the highest 10 percent earned more than $526.

Median hourly earnings of graders and sorters, agricultural products were $7.11 in 2000. The middle 50 percent earned between $6.34 and $8.78. The lowest 10 percent earned less than $5.87, and the highest 10 percent earned more than $11.18.

Median hourly earnings of agricultural inspectors were $13.75 in 2000. The middle 50 percent earned between $10.61 and $17.85.

The lowest 10 percent earned less than $8.79, and the highest 10 percent earned more than $21.91.

Few agricultural workers are members of unions.

Related Occupations

The duties of farmworkers who perform outdoor labor are related to the work of fishers and fishing vessel operators; forest, conservation, and logging workers; and grounds maintenance workers. Farmworkers who work with farm and ranch animals perform work related to that of animal care and service workers. The work of agricultural inspectors and graders and sorters is related to work performed by inspectors, testers, sorters, samplers, and weighers in manufacturing industries.

Sources of Additional Information

Information on jobs as agricultural workers is available from:

➤ National FFA Organization, The National FFA Center, Career Information Requests, P.O. Box 68690, Indianapolis, IN, 46268-0960. Internet: **http://www.ffa.org**

Information on farmworker jobs is available from:

➤ The New England Small Farm Institute, 275 Jackson St., Belchertown, MA 01007. Internet: **http://www.smallfarm.org/newoof/companions.html**

Information on obtaining a position as an agricultural inspector with the Federal Government is available from the Office of Personnel Management (OPM) through a telephone-based system. Consult your telephone directory under U.S. Government for a local number or call (912) 757-3000; Federal Relay Service: (800) 877-8339. The first number is not tollfree, and charges may result. Information also is available from the OPM Internet site: **http://www.usajobs.opm.gov**

Air Traffic Controllers

(O*NET 53-2021.00)

Significant Points

- Nearly all air traffic controllers are employed and trained by the Federal Government.
- Keen competition is expected for the few job openings in this occupation.
- Aircraft controllers earn relatively high pay and have good benefits.

Nature of the Work

The air traffic control system is a vast network of people and equipment that ensures the safe operation of commercial and private aircraft. Air traffic controllers coordinate the movement of air traffic to make certain that planes stay a safe distance apart. Their immediate concern is safety, but controllers also must direct planes efficiently to minimize delays. Some regulate airport traffic; others regulate flights between airports.

Although *airport tower* or *terminal controllers* watch over all planes traveling through the airport's airspace, their main responsibility is to organize the flow of aircraft in and out of the airport. Relying on radar and visual observation, they closely monitor each plane to ensure a safe distance between all aircraft and to guide pilots between the hangar or ramp and the end of the airport's airspace. In addition, controllers keep pilots informed about changes in weather conditions such as wind shear—a sudden change in the velocity or direction of the wind that can cause the pilot to lose control of the aircraft.

During arrival or departure, several controllers direct each plane. As a plane approaches an airport, the pilot radios ahead to inform the terminal of its presence. The controller in the radar room, just beneath the control tower, has a copy of the plane's flight plan and already has observed the plane on radar. If the path is clear, the controller directs the pilot to a runway; if the airport is busy, the plane is fitted into a traffic pattern with other aircraft waiting to land. As the plane nears the runway, the pilot is asked to contact the tower. There, another controller, who also is watching the plane on radar, monitors the aircraft the last mile or so to the runway, delaying any departures that would interfere with the plane's landing. Once the plane has landed, a ground controller in the tower directs it along the taxiways to its assigned gate. The ground controller usually works entirely by sight, but may use radar if visibility is very poor.

The procedure is reversed for departures. The ground controller directs the plane to the proper runway. The local controller then informs the pilot about conditions at the airport, such as weather, speed and direction of wind, and visibility. The local controller also issues runway clearance for the pilot to take off. Once in the air, the plane is guided out of the airport's airspace by the departure controller.

After each plane departs, airport tower controllers notify *enroute controllers* who will next take charge. There are 21 enroute control centers located around the country, each employing 300 to 700 controllers, with more than 150 on duty during peak hours at the busier facilities. Airplanes usually fly along designated routes; each center is assigned a certain airspace containing many different routes. Enroute controllers work in teams of up to three members, depending on how heavy traffic is; each team is responsible for a section of the center's airspace. A team, for example, might be responsible for all planes that are between 30 to 100 miles north of an airport and flying at an altitude between 6,000 and 18,000 feet.

To prepare for planes about to enter the team's airspace, the radar associate controller organizes flight plans coming off a printer. If two planes are scheduled to enter the team's airspace at nearly the same time, location, and altitude, this controller may arrange with the preceding control unit for one plane to change its flight path. The previous unit may have been another team at the same or an adjacent center, or a departure controller at a neighboring terminal. As a plane approaches a team's airspace, the radar controller accepts responsibility for the plane from the previous controlling unit. The controller also delegates responsibility for the plane to the next controlling unit when the plane leaves the team's airspace.

The radar controller, who is the senior team member, observes the planes in the team's airspace on radar and communicates with the pilots when necessary. Radar controllers warn pilots about nearby planes, bad weather conditions, and other potential hazards. Two planes on a collision course will be directed around each other. If a pilot wants to change altitude in search of better flying conditions, the controller will check to determine that no other planes will be along the proposed path. As the flight progresses, the team responsible for the aircraft notifies the next team in charge. Through team coordination, the plane arrives safely at its destination.

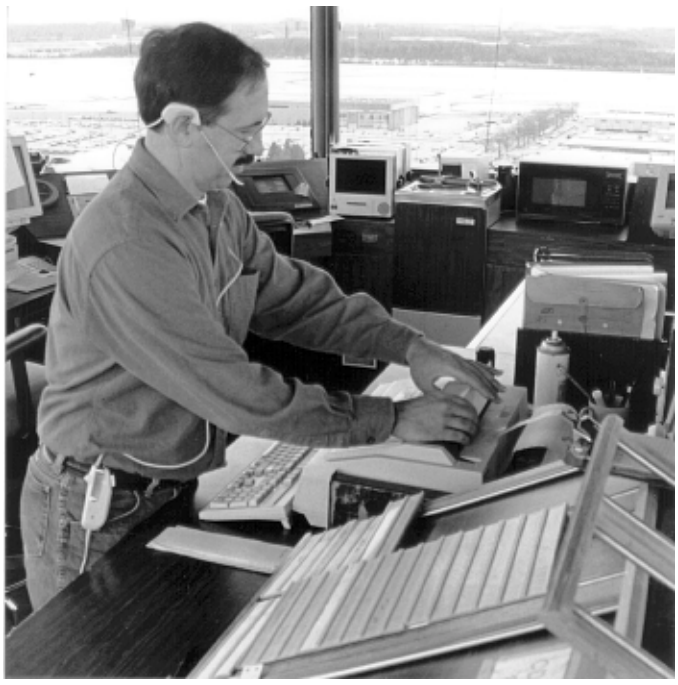
Both airport tower and enroute controllers usually control several planes at a time; often, they have to make quick decisions about completely different activities. For example, a controller might direct a plane on its landing approach and at the same time provide pilots entering the airport's airspace with information about conditions at the airport. While instructing these pilots, the controller also would observe other planes in the vicinity, such as those in a holding pattern waiting for permission to land, to ensure that they remain well separated.

In addition to airport towers and enroute centers, air traffic controllers also work in flight service stations operated at more than 100 locations. These *flight service specialists* provide pilots with information on the station's particular area, including terrain, preflight and inflight weather information, suggested routes, and other information important to the safety of a flight. Flight service station specialists help pilots in emergency situations and initiate and coordinate searches for missing or overdue aircraft. However, they are not involved in actively managing air traffic.

Some air traffic controllers work at the Federal Aviation Administration's (FAA) Air Traffic Control Systems Command Center in Herndon, Virginia, where they oversee the entire system. They look for situations that will create bottlenecks or other problems in the system, then respond with a management plan for traffic into and out of the troubled sector. The objective is to keep traffic levels in the trouble spots manageable for the controllers working at enroute centers.

Currently, the FAA is in the midst of developing and implementing a new automated air traffic control system that will allow controllers to more efficiently deal with the demands of increased air traffic. For example, some traditional air traffic controller tasks—like determining how far apart planes should be kept—will be done by computer. Present separation standards call for a 2,000-foot vertical spacing between two aircraft operating above 29,000 feet and flying the same ground track. With the aid of new technologies, the FAA will be able to reduce this vertical separation standard to 1,000 feet. Improved communication between computers on airplanes and those on the ground also is making the controller's job a little easier.

At present controllers sit at consoles with green-glowing screens that display radar images generated by a computer. In the future, controllers will work at a modern workstation computer that depicts air routes in full-color on a 20- by 20-inch screen. The controllers will select radio channels simply by touching on-screen buttons instead of turning dials or switching switches. The new technology will also enable controllers to zoom in on selected corners of the air space that is their responsibility and get better images of moving traffic than is possible with today's machines. The new automated air traffic control system is expected to become operational in several phases over the next 8 years.



Airport tower controllers coordinate arriving and departing air traffic.

The FAA is also considering implementing a system called "free flight" which would give pilots much more freedom in operating their aircraft. The change will require new concepts of shared responsibility between controllers and pilots. Air traffic controllers will still be central to the safe operation of the system, but their responsibilities will eventually shift from controlling to monitoring flights. At present, controllers assign routes, altitudes, and speeds. Under the new system, airlines and pilots would choose them. Controllers would intervene only to ensure that aircraft remained at safe distances from one another, to prevent congestion in terminal areas and entry into closed airspace, or to otherwise ensure safety. Today's practices often result in planes zigzagging from point to point along corridors rather than flying from city to city in a straight line. This results in lost time and fuel. However, it may be several years before a free flight system is implemented, despite its potential advantages. For the system to work, new equipment must be added for pilots and controllers, and new procedures developed to accommodate both the tightly controlled and flexible aspects of free flight. Budget constraints within the Federal Government may delay or slow implementation.

Working Conditions

Controllers work a basic 40-hour week; however, they may work additional hours for which they receive overtime pay or equal time off. Because most control towers and centers operate 24 hours a day, 7 days a week, controllers rotate night and weekend shifts.

During busy times, controllers must work rapidly and efficiently. This requires total concentration to keep track of several planes at the same time and make certain all pilots receive correct instructions. The mental stress of being responsible for the safety of several aircraft and their passengers can be exhausting for some persons.

Employment

Air traffic controllers held about 27,000 jobs in 2000. They were employed by the Federal Government at airports—in towers and flight service stations—and in enroute traffic control centers. The overwhelming majority worked for the FAA. Some professional controllers conduct research at the FAA's national experimental center near Atlantic City, New Jersey. Others serve as instructors at the FAA Academy in Oklahoma City, Oklahoma. A small number of civilian controllers worked for the U.S. Department of Defense. In addition to controllers employed by the Federal Government, some worked for private air traffic control companies providing service to nonFAA towers.

Training, Other Qualifications, and Advancement

Air traffic controller trainees are selected through the competitive Federal Civil Service system. Applicants must pass a written test that measures their ability to learn the controller's duties. Applicants with experience as a pilot, navigator, or military controller can improve their rating by scoring well on the occupational knowledge portion of the examination. Abstract reasoning and three-dimensional spatial visualization are among the aptitudes the exam measures. In addition, applicants usually must have 3 years of general work experience or 4 years of college, or a combination of both. Applicants also must survive a week of screening at the FAA Academy in Oklahoma City, which includes aptitude tests using computer simulators and physical and psychological examinations. Successful applicants receive drug screening tests. For airport tower

and enroute center positions, applicants must be less than 31 years old. Those 31 years old and over are eligible for positions at flight service stations.

Controllers must be articulate, because pilots must be given directions quickly and clearly. Intelligence and a good memory also are important because controllers constantly receive information that they must immediately grasp, interpret, and remember. Decisiveness also is required because controllers often have to make quick decisions. The ability to concentrate is crucial because controllers must make these decisions in the midst of noise and other distractions.

Trainees learn their jobs through a combination of formal and on-the-job training. They receive 7 months of intensive training at the FAA academy, where they learn the fundamentals of the airway system, FAA regulations, controller equipment, aircraft performance characteristics, as well as more specialized tasks. To receive a job offer, trainees must successfully complete the training and pass a series of examinations, including a controller skills test that measures speed and accuracy in recognizing and correctly solving air traffic control problems. The test requires judgments on spatial relationships and requires application of the rules and procedures contained in the Air Traffic Control Handbook. Based on aptitude and test scores, trainees are selected to work at either an enroute center or a tower.

After graduation, it takes several years of progressively more responsible work experience, interspersed with considerable classroom instruction and independent study, to become a fully qualified controller. This training includes instruction in the operation of the new, more automated air traffic control system—including the automated Microwave Landing System that enables pilots to receive instructions over automated data links—that is being installed in control sites across the country.

Controllers who fail to complete either the academy or the on-the-job portion of the training are usually dismissed. Controllers must pass a physical examination each year and a job performance examination twice each year. Failure to become certified in any position at a facility within a specified time also may result in dismissal. Controllers also are subject to drug screening as a condition of continuing employment.

At airports, new controllers begin by supplying pilots with basic flight data and airport information. They then advance to ground controller, then local controller, departure controller, and finally, arrival controller. At an enroute traffic control center, new controllers first deliver printed flight plans to teams, gradually advancing to radar associate controller and then radar controller.

Controllers can transfer to jobs at different locations or advance to supervisory positions, including management or staff jobs in air traffic control and top administrative jobs in the FAA. However, there are only limited opportunities for a controller to switch from a position in an enroute center to a tower.

Job Outlook

Extremely keen competition is expected for air traffic controller jobs because the occupation attracts many more qualified applicants than the small number of job openings that result mostly from replacement needs. Replacement needs are very low because of the relatively high pay, liberal retirement benefits, and controllers' very strong attachment to the occupation. A new FAA hiring policy, allowing eligible retired military air traffic controllers to apply for FAA positions, will make competition even keener.

Employment of air traffic controllers is expected to grow more slowly than average through the year 2010. Employment growth is not expected to keep pace with growth in the number of aircraft flying because of the implementation of a new air traffic control system over the next several years. This computerized system will assist the controller by automatically making many of the routine decisions. Automation will allow controllers to handle more traffic, thus increasing their productivity.

Air traffic controllers who continue to meet the proficiency and medical requirements enjoy more job security than most workers. The demand for air travel and the workloads of air traffic controllers decline during recessions, but controllers seldom are laid off.

Earnings

Median annual earnings of air traffic controllers in 2000 were $82,520. The middle 50 percent earned between $62,250 and $101,570. The lowest 10 percent earned less than $44,760, and the highest 10 percent earned more than $111,150.

The average annual salary, excluding overtime earnings, for air traffic controllers in the Federal Government—which employs 89 percent of the total—in nonsupervisory, supervisory, and managerial positions was $53,313 in 2001. Both the worker's job responsibilities and the complexity of the particular facility determine a controller's pay. For example, controllers who work at the FAA's busiest air traffic control facilities earn higher pay.

Depending on length of service, air traffic controllers receive 13 to 26 days of paid vacation and 13 days of paid sick leave each year, life insurance, and health benefits. In addition, controllers can retire at an earlier age and with fewer years of service than other Federal employees. Air traffic controllers are eligible to retire at age 50 with 20 years of service as an active air traffic controller or after 25 years of active service at any age. There is a mandatory retirement age of 56 for controllers who manage air traffic.

Related Occupations

Airfield operations specialists also are involved in the direction and control of traffic in air transportation.

Sources of Additional Information

Information on acquiring a job as an air traffic controller with the Federal Government may be obtained from the Office of Personnel Management through a telephone-based system. Consult your telephone directory under U.S. Government for a local number, or call (912) 757-3000; Federal Relay Service: (800) 877-8339. That number is not tollfree and charges may result. Information also is available on the Internet: **http://www.usajobs.opm.gov**.

Aircraft Pilots and Flight Engineers

(O*NET 53-2011.00, 53-2012.00)

Significant Points

- Strong competition is expected for jobs because aircraft pilots have very high earnings, especially those employed by national airlines.
- Pilots usually start with smaller commuter and regional airlines to acquire the experience needed to qualify for higher paying jobs with national airlines.
- Most pilots traditionally have learned to fly in the military, but growing numbers have college degrees with flight training from civilian flying schools that are certified by the Federal Aviation Administration (FAA).

Nature of the Work

Pilots are highly trained professionals who fly airplanes and helicopters to carry out a wide variety of tasks. Although four out of five are *airline pilots, copilots, and flight engineers* who transport passengers and cargo, others are *commercial pilots* involved in more unusual tasks, such as dusting crops, spreading seed for reforestation, testing aircraft, flying passengers and cargo to areas not service by regular airlines, directing firefighting efforts, tracking criminals, monitoring traffic, and rescuing and evacuating injured persons.

Except on small aircraft, two pilots usually make up the cockpit crew. Generally, the most experienced pilot, the *captain*, is in command and supervises all other crew members. The pilot and copilot share flying and other duties, such as communicating with air traffic controllers and monitoring the instruments. Some large aircraft have a third pilot—*the flight engineer*—who assists the other pilots by monitoring and operating many of the instruments and systems, making minor inflight repairs, and watching for other aircraft. New technology can perform many flight tasks, however, and virtually all new aircraft now fly with only two pilots, who rely more heavily on computerized controls. As older, less technologically sophisticated aircraft continue to be retired from airline fleets, the number of flight engineer jobs will decrease.

Before departure, pilots plan their flights carefully. They thoroughly check their aircraft to make sure that the engines, controls, instruments, and other systems are functioning properly. They also make sure that baggage or cargo has been loaded correctly. They confer with flight dispatchers and aviation weather forecasters to find out about weather conditions en route and at their destination. Based on this information, they choose a route, altitude, and speed that will provide the fastest, safest, and smoothest flight. When flying under instrument flight rules—procedures governing the operation of the aircraft when there is poor visibility—the pilot in command, or the company dispatcher, normally files an instrument flight plan with air traffic control so that the flight can be coordinated with other air traffic.

Takeoff and landing are the most difficult parts of the flight, and require close coordination between the pilot and first officer. For example, as the plane accelerates for takeoff, the pilot concentrates on the runway while the first officer scans the instrument panel. To calculate the speed they must attain to become airborne, pilots consider the altitude of the airport, outside temperature, weight of the plane, and speed and direction of the wind. The moment the plane reaches takeoff speed, the first officer informs the pilot, who then pulls back on the controls to raise the nose of the plane.

Unless the weather is bad, the actual flight is relatively easy. Airplane pilots, with the assistance of autopilot and the flight management computer, steer the plane along their planned route and are monitored by the air traffic control stations they pass along the way. They regularly scan the instrument panel to check their fuel supply, the condition of their engines, and the air-conditioning, hydraulic, and other systems. Pilots may request a change in altitude or route if circumstances dictate. For example, if the ride is rougher than expected, they may ask air traffic control if pilots flying at other altitudes have reported better conditions. If so, they may request an altitude change. This procedure also may be used to find a stronger tailwind or a weaker headwind to save fuel and increase speed.

In contrast, helicopters are used for short trips at relatively low altitude, so pilots must be constantly on the lookout for trees, bridges, power lines, transmission towers, and other dangerous obstacles. Regardless of the type of aircraft, all pilots must monitor warning devices designed to help detect sudden shifts in wind conditions that can cause crashes.

Pilots employed in the aerial spraying of crops also may be responsible for loading their planes with chemicals.

Pilots must rely completely on their instruments when visibility is poor. On the basis of altimeter readings, they know how high above ground they are and whether they can fly safely over mountains and other obstacles. Special navigation radios give pilots precise information that, with the help of special maps, tells them their exact position. Other very sophisticated equipment provides directions to a point just above the end of a runway and enables pilots to land completely "blind." Once on the ground, pilots must complete records on their flight for their organization and the FAA report.

The number of nonflying duties that pilots have depends on the employment setting. Airline pilots have the services of large support staffs, and consequently, perform few nonflying duties. Pilots employed by other organizations such as charter operators or businesses have many other duties. They may load the aircraft, handle all passenger luggage to ensure a balanced load, and supervise refueling; other nonflying responsibilities include keeping records, scheduling flights, arranging for major maintenance, and performing minor aircraft maintenance and repairwork.

Some pilots are instructors. They teach their students the principles of flight in ground-school classes and demonstrate how to operate aircraft in dual-controlled planes and helicopters. A few specially trained pilots are "examiners" or "check pilots." They periodically fly with other pilots or pilot's license applicants to make sure that they are proficient.

Working Conditions

By law, airline pilots cannot fly more than 100 hours a month or more than 1,000 hours a year. Most airline pilots fly an average of 75 hours a month and work an additional 75 hours a month performing nonflying duties. About one-fourth of all pilots work more than 40 hours a week. Most spend a considerable amount of time away from home because the majority of flights involve overnight layovers. When pilots are away from home, the airlines provide hotel accommodations, transportation between the hotel and airport, and an allowance for meals and other expenses. Airlines operate flights at all hours of the day and night, so work schedules often are irregular. Flight assignments are based on seniority.

Those pilots not employed by the airlines often have irregular schedules as well; they may fly 30 hours one month and 90 hours the next. Because these pilots frequently have many nonflying responsibilities, they have much less free time than do airline pilots. Except for business pilots, most do not remain away from home overnight. They may work odd hours. Flight instructors may have irregular and seasonal work schedules, depending on their students' available time and the weather. Instructors frequently work at night or on weekends.

Airline pilots, especially those on international routes, often suffer jet lag—fatigue caused by many hours of flying through different time zones. To guard against excessive pilot fatigue that could result in unsafe flying conditions, the FAA requires airlines to allow pilots at least 8 hours of uninterrupted rest in the 24 hours before finishing their flight duty. The work of test pilots, who check the flight performance of new and experimental planes, may be dangerous. Pilots who are crop dusters may be exposed to toxic chemicals and seldom have the benefit of a regular landing strip. Helicopter pilots involved in policework may be subject to personal injury.

Although flying does not involve much physical effort, the mental stress of being responsible for a safe flight, no matter what the weather, can be tiring. Pilots must be alert and quick to react if something goes wrong, particularly during takeoff and landing.

Employment

Civilian aircraft pilots and flight engineers held about 117,000 jobs in 2000. About 84 percent worked as airline pilots, copilots, and flight engineers. The remainder were commercial pilots who worked as flight instructors at local airports or for large businesses that fly company cargo and executives in their own airplanes or helicopters. Some commercial pilots flew small planes for air taxi companies, usually to or from lightly traveled airports not served by major airlines. Others worked for a variety of businesses, performing tasks such as crop dusting, inspecting pipelines, or conducting sightseeing trips. Federal, State, and local governments also employed pilots. A few pilots were self-employed.

The employment of airplane pilots is not distributed like the population. Pilots are more concentrated in California, New York, Illinois, Washington, Michigan, Georgia, New Jersey, Florida, the District of Columbia, and Texas, which have a high amount of flying activity relative to their population.

Training, Other Qualifications, and Advancement

All pilots who are paid to transport passengers or cargo must have a commercial pilot's license with an instrument rating issued by the FAA. Helicopter pilots must hold a commercial pilot's certificate with a helicopter rating. To qualify for these licenses, applicants must be at least 18 years old and have at least 250 hours of flight experience. The experience required can be reduced through participation in certain flight school curricula approved by the FAA. Applicants also must pass a strict physical examination to make sure that they are in good health and have 20/20 vision with or without glasses, good hearing, and no physical handicaps that could impair their performance. They must pass a written test that includes questions on the principles of safe flight, navigation techniques, and FAA regulations and must demonstrate their flying ability to FAA or designated examiners.

To fly in periods of low visibility, pilots must be rated by the FAA to fly by instruments. Pilots may qualify for this rating by having 105 hours of flight experience, including 40 hours of experience in flying by instruments; they also must pass a written examination on procedures and FAA regulations covering instrument flying and demonstrate to an examiner their ability to fly by instruments.

Airline pilots must fulfill additional requirements. Pilots must have an airline transport pilot's license. Applicants for this license must be at least 23 years old and have a minimum of 1,500 hours of flying experience, including night and instrument flying, and must pass FAA written and flight examinations. Usually, they also have one or more advanced ratings, such as multi-engine aircraft or aircraft type ratings dependent upon the requirements of their particular flying jobs. Because pilots must be able to make quick decisions and accurate judgments under pressure, many airline companies reject applicants who do not pass required psychological and aptitude tests. All licenses are valid so long as a pilot can pass the periodic physical examinations and tests of flying skills required by Federal Government and company regulations. Depending on their physical condition, a pilot license may have a Class I, II, and III Medical certificate. A Class I Medical Certificate requires the highest standards for vision, hearing, equilibrium, and general physical condition. Requirements for a Class II Medical Certificate are less rigid, but still require a high degree of physical health and an excellent medical history. A Class III Medical Certificate has the least stringent physical requirements. All three classes of medical certificates allow the pilot to wear glasses provided the correction is within the prescribed limits of vision.

The Armed Forces have always been an important source of trained pilots for civilian jobs. Military pilots gain valuable experience on jet aircraft and helicopters, and persons with this experience usually are preferred for civilian pilot jobs. This primarily reflects the extensive flying time military pilots receive. Persons without Armed Forces training may become pilots by attending flight schools. The FAA has certified about 600 civilian flying schools, including some colleges and universities that offer degree credit for pilot training. Over the projection period, Federal budget reductions are expected to reduce military pilot training. As a result, FAA-certified schools will train a larger share of pilots than in the past. Prospective pilots also may learn to fly by taking lessons from individual FAA-certified flight instructors.

Although some small airlines will hire high school graduates, most airlines require at least 2 years of college and prefer to hire college graduates. In fact, most entrants to this occupation have a college degree. Because the number of college educated applicants continues to increase, many employers are making a college degree an educational requirement.

Depending on the type of aircraft, new airline pilots start as first officers or flight engineers. Although some airlines favor applicants who already have a flight engineer's license, they may provide flight engineer training for those who have only the commercial license. Many pilots begin with smaller regional or commuter airlines, where they obtain experience flying passengers on scheduled flights into busy airports in all weather conditions. These jobs often lead to higher paying jobs with bigger, national airlines.

Initial training for airline pilots includes a week of company indoctrination, 3 to 6 weeks of ground school and simulator training, and 25 hours of initial operating experience, including a check-ride with an FAA aviation safety inspector. Once trained and "on the

line," pilots are required to attend recurrent training and simulator checks twice a year throughout their career.

Organizations other than airlines usually require less flying experience. However, a commercial pilot's license is a minimum requirement, and employers prefer applicants who have experience in the type of craft they will be flying. New employees usually start as first officers, or fly less sophisticated equipment. Test pilots often are required to have an engineering degree.

Advancement for all pilots usually is limited to other flying jobs. Many pilots start as flight instructors, building up their flying hours while they earn money teaching. As they become more experienced, these pilots occasionally fly charter planes or perhaps get jobs with small air transportation firms, such as air taxi companies. Some advance to business flying jobs. A small number get flight engineer jobs with the airlines.

In the airlines, advancement usually depends on seniority provisions of union contracts. After 1 to 5 years, flight engineers advance according to seniority to first officer and, after 5 to 15 years, to captain. Seniority also determines which pilots get the more desirable routes. In a nonairline job, a first officer may advance to pilot and, in large companies, to chief pilot or director of aviation in charge of aircraft scheduling, maintenance, and flight procedures.

Job Outlook

Pilots are expected to face strong competition for jobs through the year 2010. Many qualified persons seek jobs in this occupation because it offers very high earnings, glamour, prestige, and free or low-cost travel benefits. As time passes, some pilots will fail to maintain their qualifications, and the number of applicants competing for each opening should decline. Factors affecting demand, however, are not expected to ease that competition.

Relatively few jobs will be created from rising demand for pilots, even though employment is expected to increase about as fast as the average for all occupations through 2010. Expected growth in domestic and international airline passenger and cargo traffic will create a need for more airliners, pilots, and flight instructors. However, computerized flight management systems on new aircraft will continue to eliminate the need for flight engineers on those planes, thus restricting the growth of pilot employment. In addition, the trend toward using larger planes in the airline industry will increase pilot productivity. Future business travel could also be adversely affected by the growing use of teleconferencing, facsimile mail, and electronic communications—such as e-mail—as well as by the elimination of middle management positions in corporate downsizing. Employment of business pilots is expected to grow more slowly than in the past as more businesses opt to fly with regional and smaller airlines serving their area rather than to buy and operate their own aircraft. The number of job openings resulting from the need to replace pilots who retire or leave the occupation traditionally has been very low. Aircraft pilots usually have a strong attachment to their occupation because it requires a substantial investment in specialized training that is not transferable to other fields, and it commonly offers very high earnings. However, many of the pilots who were hired in the late 1960s are approaching the age for mandatory retirement and, thus, several thousand job openings are expected to be generated each year.

Pilots who have logged the greatest number of flying hours in the more sophisticated equipment typically have the best prospects. For this reason, military pilots often have an advantage over other applicants. Job seekers with the most FAA licenses also will have a competitive advantage. Opportunities for pilots in the regional commuter airlines and international service are expected to be more favorable, as these segments are expected to grow faster than other segments of the industry.

Employment of pilots is sensitive to cyclical swings in the economy. During recessions, when a decline in the demand for air travel forces airlines to curtail the number of flights, airlines may temporarily furlough some pilots. Commercial and corporate flying, flight instruction, and testing of new aircraft also decline during recessions, adversely affecting the employment of pilots in those areas.

Earnings

Earnings of aircraft pilots and flight engineers vary greatly depending whether they work as airline or commercial pilots. Earnings of airline pilots are among the highest in the Nation, and depend on factors such as the type, size, and maximum speed of the plane and the number of hours and miles flown. For example, pilots who fly jet aircraft usually earn higher salaries than do pilots who fly turboprops. Airline pilots and flight engineers may earn extra pay for night and international flights. In 2000, median annual earnings of airline pilots, copilots, and flight engineers were $110,940. The lowest 10 percent earned less than $36,110. Over 25 percent earned more than $145,000.

Median annual earnings of commercial pilots were $43,300 in 2000. The middle 50 percent earned between $31,500 and $61,230. The lowest 10 percent earned less than $24,290, and the highest 10 percent earned more than $92,000.

Airline pilots usually are eligible for life and health insurance plans financed by the airlines. They also receive retirement benefits and, if they fail the FAA physical examination at some point in their careers, they get disability payments. In addition, pilots receive an expense allowance, or "per diem," for every hour they are away from home. Per diem can represent up to $500 each month in addition to their salary. Some airlines also provide allowances to pilots for purchasing and cleaning their uniforms. As an additional benefit, pilots and their immediate families usually are entitled to free or reduced fare transportation on their own and other airlines.

More than one-half of all aircraft pilots are members of unions. Most of the pilots who fly for the major airlines are members of the Airline Pilots Association, International, but those employed by one major airline are members of the Allied Pilots Association. Some flight engineers are members of the Flight Engineers' International Association.

Related Occupations

Although they are not in the cockpit, air traffic controllers and airfield operation specialists also play an important role in making sure flights are safe and on schedule, and participate in many of the decisions that pilots must make.

Sources of Additional Information

Information about job opportunities, salaries for a particular airline, and qualifications required may be obtained by writing to the personnel manager of the airline.

For information on airline pilots, contact:

➤ Airline Pilots Association, 1625 Massachusetts Ave. NW., Washington, DC 20036.

➤ Air Transport Association of America, Inc., 1301 Pennsylvania Ave. NW., Suite 1100, Washington, DC 20004.

For information on helicopter pilots, contact:

➤ Helicopter Association International, 1619 Duke St., Alexandria, VA 22314.

For a copy of the List of Certificated Pilot Schools, write to:

➤ Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. There is a charge for this publication.

For information about job opportunities in companies other than airlines, consult the classified section of aviation trade magazines and apply to companies that operate aircraft at local airports.

Busdrivers

(O*NET 53-3021.00, 53-3022.00)

Significant Points

- Opportunities should be good, particularly for school busdriver jobs.
- A commercial driver's license is required to operate on interstate bus routes.
- Busdrivers must posses strong customer service skills, including communication skills and the ability to manage large groups of people with varying needs.

Nature of the Work

Millions of Americans every day leave the driving to busdrivers. Busdrivers are essential in providing passengers with an alternative to their automobiles or other forms of transportation. Intercity busdrivers transport people between regions of a State or of the country; local transit busdrivers, within a metropolitan area or county; motorcoach drivers, on charter excursions and tours; and school busdrivers, to and from schools and related events.

Drivers pick up and drop off passengers at bus stops, stations, or, in the case of students, at regularly scheduled neighborhood locations based on strict time schedules. Drivers must operate vehicles safely, especially when traffic is heavier than normal. However, they cannot let light traffic put them ahead of schedule so that they miss passengers.

Local transit and intercity busdrivers report to their assigned terminal or garage, where they stock up on tickets or transfers and prepare trip report forms. In some firms, maintenance departments are responsible for keeping vehicles in good condition. In others, drivers may check their vehicle's tires, brakes, windshield wipers, lights, oil, fuel, and water supply, before beginning their routes. Drivers usually verify that the bus has safety equipment, such as fire extinguishers, first aid kits, and emergency reflectors in case of an emergency.

During the course of their shift, local transit and intercity busdrivers collect fares; answer questions about schedules, routes, and transfer points; and sometimes announce stops. Intercity busdrivers may make only a single one-way trip to a distant city or a round trip each day. They may stop at towns just a few miles apart or only at large cities hundreds of miles apart. Local transit busdrivers may make several trips each day over the same city and suburban streets, stopping as frequently as every few blocks.

Local transit busdrivers submit daily trip reports with a record of trips, significant schedule delays, and mechanical problems. Intercity drivers who drive across State or national boundaries must comply with U.S. Department of Transportation regulations. These include completing vehicle inspection reports and recording distances traveled and the periods they spend driving, performing other duties, and off duty.

Motorcoach drivers transport passengers on charter trips and sightseeing tours. Drivers routinely interact with customers and tour guides to make the trip as comfortable and informative as possible. They are directly responsible for keeping to strict schedules, adhering to the guidelines of the tours' itinerary, and the overall success of the trip. These drivers act as customer service representative, tour guide, program director, and safety guide. Trips frequently last more than one day. The driver may be away for more than a week if assigned to an extended tour. As with all drivers who drive across State or national boundaries, motorcoach drivers must comply with Department of Transportation regulations.

Regular local transit busdrivers usually have a 5-day workweek, which may include weekends.

School busdrivers usually drive the same routes each day, stopping to pick up pupils in the morning and return them to their homes in the afternoon. Some school busdrivers also transport students and teachers on field trips or to sporting events. In addition to driving, some school busdrivers work part time in the school system as janitors, mechanics, or classroom assistants when not driving buses.

Busdrivers must be alert to prevent accidents, especially in heavy traffic or in bad weather, and to avoid sudden stops or swerves that jar passengers. School busdrivers must exercise particular caution when children are getting on or off the bus. They must maintain order on their bus and enforce school safety standards by allowing only students to board. In addition, they must know and enforce rules regarding student conduct used throughout the school system.

School busdrivers do not always have to report to an assigned terminal or garage. In some cases, school busdrivers often have the choice of taking their bus home, or parking it in a more convenient area. School busdrivers do not collect fares. Instead, they prepare weekly reports on the number of students, trips or runs, work hours, miles, and the amount of fuel consumption. Their supervisors set time schedules and routes for the day or week.

Working Conditions

Driving a bus through heavy traffic while dealing with passengers is more stressful and fatiguing than physically strenuous. Many drivers enjoy the opportunity to work without direct supervision, with full responsibility for their bus and passengers. To improve working conditions and retain drivers, many bus lines provide ergonomically designed seats and controls for drivers.

Intercity busdrivers may work nights, weekends, and holidays and often spend nights away from home, where they stay in hotels at company expense. Senior drivers with regular routes have regular weekly work schedules, but others do not have regular schedules and must be prepared to report for work on short notice. They report for work only when called for a charter assignment or to drive extra buses on a regular route. Intercity bus travel and charter work tends to be seasonal. From May through August, drivers may work the maximum number of hours per week that regulations allow. During winter, junior drivers may work infrequently, except for busy holiday travel periods, and may be furloughed for periods.

School busdrivers work only when school is in session. Many work 20 hours a week or less, driving one or two routes in the morning and afternoon. Drivers taking field or athletic trips or who also have midday kindergarten routes may work more hours a week. As

more students with a variety of physical and behavioral disabilities assimilate into mainstream schools, school busdrivers must learn how to accommodate their special needs.

Regular local transit busdrivers usually have a 5-day workweek; Saturdays and Sundays are considered regular workdays. Some drivers work evenings and after midnight. To accommodate commuters, many work "split shifts," for example, 6 a.m. to 10 a.m. and 3 p.m. to 7 p.m., with time off in between.

Tour and charter busdrivers may work any day and all hours of the day, including weekends and holidays. Their hours are dictated by the charter trips booked and the schedule and prearranged itinerary of tours. However, like all busdrivers, their weekly hours must be consistent with the Department of Transportation's rules and regulations concerning hours of service. For example, a driver may drive for 10 hours, and work up to 15 hours—including driving and non-driving duties—before having 8 hours off-duty. A driver may not drive after having worked for 70 hours in the past 8 days. Most drivers are required to document their time in a logbook.

Employment

Busdrivers held about 666,000 jobs in 2000. More than a third worked part time. About two-thirds of all drivers worked for school systems or companies providing school bus services under contract. Most of the remainder worked for private and local government transit systems; some also worked for intercity and charter bus lines.

Training, Other Qualifications, and Advancement

Busdriver qualifications and standards are established by State and Federal regulations. All drivers must comply with Federal regulations and any State regulations that exceed Federal requirements. Federal regulations require drivers who operate vehicles designed to transport 16 or more passengers to hold a commercial driver's license (CDL) from the State in which they live.

To qualify for a commercial driver's license, applicants must pass a written test on rules and regulations and then demonstrate they can operate a bus safely. A national data bank permanently records all driving violations incurred by persons who hold commercial licenses. A State may not issue a commercial driver's license to a driver who already has a license suspended or revoked in another State. A driver with a CDL must accompany trainees until they get their own CDL. Information on how to apply for a commercial driver's license may be obtained from State motor vehicle administrations.

While many States allow those who are 18 years and older to drive buses within State borders, the Department of Transportation establishes minimum qualifications for busdrivers engaged in interstate commerce. Federal Motor Carrier Safety Regulations require drivers to be at least 21 years old and pass a physical examination once every 2 years. The main physical requirements include good hearing, 20/40 vision with or without glasses or corrective lenses, and a 70-degree field of vision in each eye. Drivers must not be colorblind. They must be able to hear a forced whisper in one ear at not less than 5 feet, with or without a hearing aide. Drivers must have normal use of arms and legs and normal blood pressure. They may not use any controlled substances, unless prescribed by a licensed physician. Persons with epilepsy or diabetes controlled by insulin are not permitted to be interstate busdrivers. Federal regulations also require employers to test their drivers for alcohol and drug use as a condition of employment, and require periodic random tests while on duty. In addition, a driver must not have been convicted of a felony involving the use of a motor vehicle; a crime involving drugs; driving under the influence of drugs or alcohol; or hit-and-run driving which resulted in injury or death. All drivers must be able to read and speak English well enough to read road signs, prepare reports, and communicate with law enforcement officers and the public. In addition, drivers must take a written examination on the Motor Carrier Safety Regulations of the U.S. Department of Transportation.

Many employers prefer high school graduates and require a written test of ability to follow complex bus schedules. Many intercity and public transit bus companies prefer applicants who are at least 24 years of age; some require several years of bus or truck driving experience. In some States, school busdrivers must pass a background investigation to uncover any criminal record or history of mental problems.

Because busdrivers deal with passengers, they must be courteous. They need an even temperament and emotional stability because driving in heavy, fast-moving, or stop-and-go traffic and dealing with passengers can be stressful. Drivers must have strong customer service skills, including communication skills and the ability to coordinate and manage large groups of people.

Most intercity bus companies and local transit systems give driver trainees 2 to 8 weeks of classroom and "behind-the-wheel" instruction. In the classroom, trainees learn Department of Transportation and company work rules, safety regulations, State and municipal driving regulations, and safe driving practices. They also learn to read schedules, determine fares, keep records, and deal courteously with passengers.

School busdrivers are also required to obtain a commercial driver's license from the State in which they live. Many persons who enter school busdriving have never driven any vehicle larger than an automobile. They receive between 1 and 4 weeks of driving instruction plus classroom training on State and local laws, regulations, and policies of operating school buses; safe driving practices; driver-pupil relations; first aid; special needs of disabled and emotionally troubled students; and emergency evacuation procedures. School busdrivers also must be aware of school systems rules for discipline and conduct for busdrivers and the students they transport.

During training, busdrivers practice driving on set courses. They practice turns and zigzag maneuvers, backing up, and driving in narrow lanes. Then they drive in light traffic and, eventually, on congested highways and city streets. They also make trial runs, without passengers, to improve their driving skills and learn the routes. Local transit trainees memorize and drive each of the runs operating out of their assigned garage. New drivers begin with a "break-in" period. They make regularly scheduled trips with passengers, accompanied by an experienced driver who gives helpful tips, answers questions, and evaluates the new driver's performance.

New intercity and local transit drivers are usually placed on an "extra" list to drive charter runs, extra buses on regular runs, and special runs (for example, during morning and evening rush hours and to sports events). They also substitute for regular drivers who are ill or on vacation. New drivers remain on the extra list, and may work only part time, perhaps for several years, until they have enough seniority to receive a regular run.

Senior drivers may bid for runs they prefer, such as those with more work hours, lighter traffic, weekends off, or, in the case of intercity busdrivers, higher earnings or fewer workdays per week.

Opportunities for promotion are generally limited. However, experienced drivers may become supervisors or dispatchers, assigning buses to drivers, checking whether drivers are on schedule, rerouting buses to avoid blocked streets or other problems, and dispatching extra vehicles and service crews to scenes of accidents and breakdowns. In transit agencies with rail systems, drivers may become train operators or station attendants. A few drivers become managers. Promotion in publicly owned bus systems is often by competitive civil service examination. Some motorcoach drivers purchase their own equipment and go in to business for themselves.

Job Outlook

Persons seeking jobs as busdrivers should encounter good opportunities. Many employers have recently had difficulty finding qualified candidates to fill vacancies left by departing employees. Opportunities should be best for individuals with good driving records who are willing to start on a part-time or irregular schedule, as well as for those seeking jobs as school busdrivers in rapidly growing suburban areas. Those seeking higher paying intercity and public transit busdriver positions may encounter competition.

Employment of busdrivers is expected to increase about as fast as average for all occupations through the year 2010, primarily to meet the transportation needs of a growing school-age population and local environmental concerns. Thousands of additional job openings are expected to occur each year because of the need to replace workers who take jobs in other occupations, retire, or leave the occupation for other reasons.

School busdriving jobs should be easiest to acquire because most are part time positions with high turnover and minimal training requirements. The number of school busdrivers is expected to increase as a result of growth in elementary and secondary school enrollments. In addition, as more of the Nation's population is concentrated in suburban areas—where students generally ride school buses—and less in the central cities—where transportation is not provided for most pupils—more school busdrivers will be needed.

Employment of local transit and intercity drivers will grow as bus ridership increases due to population growth. There may be competition for positions with more regular hours and steady driving routes.

Competition from other modes of transportation—airplane, train, or automobile—will temper growth in the intercity bus industry. Most growth in intercity bus lines will occur in group charters to locations not served by other modes of transportation. Like automobiles, buses have a far greater number of possible travel destinations than airplanes or trains. Due to greater cost savings and convenience over automobiles, buses usually are the most economical option for tour groups heading to out-of-the-way destinations.

Full-time busdrivers are rarely laid off during recessions. However, employers might reduce hours of part-time local transit and intercity busdrivers if bus ridership decreases, because fewer extra buses would be needed. Seasonal layoffs are common. Many intercity busdrivers with little seniority, for example, are furloughed during the winter when regular schedule and charter business falls off; school busdrivers seldom work during the summer or school holidays.

Earnings

Median hourly earnings of transit and intercity busdrivers were $12.36 in 2000. The middle 50 percent earned between $9.47 and $16.78 an hour. The lowest 10 percent earned less than $7.64, and the highest 10 percent earned more than $20.03 an hour. Median hourly earnings in the industries employing the largest numbers of transit and intercity busdrivers in 2000 were as follows:

Local government	$14.68
Intercity and rural bus transportation	14.60
Local and suburban transportation	11.48
School buses	10.67
Bus charter service	10.27

Median hourly earnings of school busdrivers were $10.05 in 2000. The middle 50 percent earned between $7.28 and $12.74 an hour. The lowest 10 percent earned less than $5.99, and the highest 10 percent earned more than $15.48 an hour. Median hourly earnings in the industries employing the largest numbers of school busdrivers in 2000 were as follows:

School buses	$10.50
Elementary and secondary schools	9.97
Local and suburban transportation	9.49
Child daycare services	8.12
Individual and family services	7.84

The benefits busdrivers receive from their employers vary greatly. Most intercity and local transit busdrivers receive paid health and life insurance, sick leave, and free bus rides on any of the regular routes of their line or system. Drivers who work full time also get as much as 4 weeks of vacation annually. Most local transit busdrivers are also covered by dental insurance and pension plans. School busdrivers receive sick leave, and many are covered by health and life insurance and pension plans. Because they generally do not work when school is not in session, they do not get vacation leave. In a number of States, local transit and school busdrivers employed by local governments are covered by a statewide public employee pension system. Increasingly, school systems extend benefits to drivers who supplement their driving by working in the school system during off hours.

Most intercity and many local transit busdrivers are members of the Amalgamated Transit Union. Local transit busdrivers in New York and several other large cities belong to the Transport Workers Union of America. Some drivers belong to the United Transportation Union and the International Brotherhood of Teamsters.

Related Occupations

Other workers who drive vehicles on highways and city streets are ambulance drivers and attendants, except emergency medical technicians; taxi drivers and chauffeurs; and truckdrivers and driver/sales workers.

Sources of Additional Information

For information on employment opportunities, contact local transit systems, intercity bus lines, school systems, or the local offices of the State employment service.

General information on busdriving is available from:

➤ American Bus Association, 1100 New York Ave. NW., Suite 1050, Washington, DC 20005. Internet: **http://www.buses.org**

General information on school bus driving is available from:

➤ National School Transportation Association, 625 Slaters Lane, Suite 205, Alexandria, VA 22314.

➤ School Bus Fleet, 21061 S. Western Ave., Torrance, CA 90501.

General information on local transit busdriving is available from:

➤ American Public Transportation Association, 1666 K St. NW., Suite 1100, Washington, DC 20006. Internet: **http://www.apta.com**

General information on motorcoach driving is available from:

➤ United Motorcoach Association, 113 S. West St., 4th Floor, Alexandria, VA 22314. Telephone (tollfree): 800-424-8262.

Fishers and Fishing Vessel Operators

(O*NET 45-3011.00)

Significant Points

- Over 60 percent of the workers are self-employed, among the highest proportion in the workforce.
- Many jobs require strenuous work and long hours, and provide only seasonal employment.
- Employment is projected to decline, due to depletion of fish stocks and new Federal and State laws restricting both commercial and recreational fishing.

Nature of the Work

Fishers and fishing vessel operators catch and trap various types of marine life for human consumption, animal feed, bait, and other uses. (Aquaculture—the raising and harvesting for commercial purposes of fish and other aquatic life in ponds or confined bodies of water—is covered in the *Handbook* statement on farmers, ranchers, and agricultural managers.)

Fishing hundreds of miles from shore with commercial fishing vessels—large boats capable of hauling a catch of tens of thousands of pounds of fish—requires a crew including a captain, or skipper, a first mate and sometimes a second mate, boatswain (called a deckboss on some smaller boats), and deckhands with specialized skills.

The *fishing boat captain* plans and oversees the fishing operation—the fish to be sought, the location of the best fishing grounds, the method of capture, the duration of the trip, and the sale of the catch.

The captain ensures the fishing vessel is seaworthy; oversees the purchase of supplies, gear, and equipment such as fuel, netting, and cables; obtains the required fishing permits and licenses; and hires qualified crew members and assigns their duties. The captain plots the vessel's course, using navigation instruments and aids such as compasses, sextants, and charts, in addition to electronic navigational equipment such as autopilots, loran systems, and satellite navigation systems. Ships also use radar to avoid obstacles and depth sounders to indicate the water depth and the existence of marine life between the vessel and sea bottom. Sophisticated tracking technology allows captains to better locate and analyze schools of fish. The captain directs the fishing operation through the officers, and records daily activities in the ship's log. Upon returning to port, the captain arranges for the sale of the catch—directly to buyers or through a fish auction—and ensures that each crew member receives the prearranged portion of adjusted net proceeds from the sale of the catch. Some captains have begun buying and selling fish via the Internet; and as electronic commerce grows as a method to find buyers for fresh catch, more captains may use computers.

The *first mate*—the captain's assistant, who must be familiar with navigation requirements and the operation of all electronic equipment—assumes control of the vessel when the captain is off duty. Duty shifts, called watches, usually last 6 hours. The mate's regular duty, with the help of the boatswain and under the captain's oversight, is to direct the fishing operations and sailing responsibilities of the deckhands. These include the operation, maintenance, and repair of the vessel, and the gathering, preservation, stowing, and unloading of the catch.

The *boatswain*, a highly experienced deckhand with supervisory responsibilities, directs the *deckhands* as they carry out the sailing and fishing operations. Before departure, the boatswain directs the deckhands to load equipment and supplies, either by hand or with hoisting equipment, and to untie lines from other boats and the dock. When necessary, boatswains repair fishing gear, equipment, nets, and accessories. They operate the fishing gear, letting out and pulling in nets and lines. They extract the catch such as pollock, flounder, menhaden, and tuna, from the nets or lines' hooks. Deckhands use dip nets to prevent the escape of small fish and gaffs to facilitate the landing of large fish. They then wash, salt, ice, and stow away the catch. Deckhands also must ensure that decks are clear and clean at all times and the vessel's engines and equipment are kept in good working order. Upon return to port, they secure the vessel's lines to and from the docks and other vessels. Unless "lumpers" (laborers or longshore workers) are hired, the deckhands unload the catch.

Large fishing vessels that operate in deep water generally have technologically advanced equipment, and some may have facilities on board where the fish are processed and prepared for sale. Such vessels are equipped for long stays at sea and can perform the work of several smaller boats.

Although fishing has become more mechanized, netting and hauling the catch aboard is strenuous work.

Some full-time and many part-time fishers work on small boats in relatively shallow waters, often in sight of land. Navigation and communication needs are vital and constant for almost all types of boats. Crews are small—usually only one or two people collaborate on all aspects of the fishing operation. This may include placing gill nets across the mouths of rivers or inlets, entrapment nets in bays and lakes, or pots and traps for fish or shellfish such as lobsters and crabs. Dredges and scrapes are sometimes used to gather shellfish such as oysters and scallops. A very small proportion of commercial fishing is conducted as diving operations. Depending upon the water's depth, divers—wearing regulation diving suits with an umbilical (air line) or a scuba outfit and equipment—use spears to catch fish and use nets and other equipment to gather shellfish, coral, sea urchins, abalone, and sponges. In very shallow waters, fish are caught from small boats having an outboard motor, from rowboats, or by wading or seining from shore. Fishers use a wide variety of hand-operated equipment—for example, nets, tongs, rakes, hoes, hooks, and shovels—to gather fish and shellfish; catch amphibians and reptiles such as frogs and turtles; and harvest marine vegetation, such as Irish moss and kelp.

Although historically most fishers were involved with the traditional commercial fishery, some captains and deckhands are primarily employed in support of the sport or recreational fishery. Typically, a group of people charter a fishing vessel—for periods ranging from several hours to a number of days—for sport fishing, socializing, and relaxation and employ a captain and possibly several deckhands. This industry had experienced significant growth in the 1970s and 1980s, but declined in the 1990s because of the limited availability of fish.

Working Conditions

Fishing operations are conducted under various environmental conditions, depending on the region of the country and the kind of species sought. Storms, fog, and wind may hamper fishing vessels. Divers are affected by murky water and unexpected shifts in underwater currents. In relatively busy fisheries, smaller boats have to take care not to be hit by larger vessels.

Fishers and fishing vessel operators work under hazardous conditions, and often help is not readily available. Malfunctioning navigation or communication equipment may lead to collisions or shipwrecks. Malfunctioning fishing gear poses the danger of injury

to the crew, who also must guard against entanglement in fishing nets and gear, slippery decks resulting from fish processing operations, ice formation in the winter, or being swept overboard—a fearsome situation. Also, treatment for any serious injuries may have to await transfer to a hospital. Divers must guard against entanglement of air lines, malfunction of scuba equipment, decompression problems, and attacks by predatory fish.

Fishers and fishing vessel operators face strenuous outdoor work and long hours. Commercial fishing trips may require a stay of several weeks, or even months—hundreds of miles away from home port. The pace of work may vary, but even during travel between home port and the fishing grounds, deckhands on smaller boats try to finish their cleaning duties so that there are no chores remaining to be done at port. However, lookout watches are a regular responsibility, and crew members must be prepared to stand watch at prearranged times of the day or night. Although fishing gear has improved, and operations have become more mechanized, netting and processing fish are strenuous activities. Whereas newer vessels have improved living quarters and amenities, such as television and shower stalls, crews still experience the aggravations of confined conditions, continuous close personal contact, and the absence of family.

Employment

Fishers and fishing vessel operators held an estimated 53,000 jobs in 2000. More than 6 out of 10 were self-employed. Besides fishing conducted primarily to harvest food, some jobs involved sport fishing activities.

Training, Other Qualifications, and Advancement

Fishers usually acquire occupational skills on the job, many as members of families involved in fishing activities. No formal academic requirements exist. Operators of large commercial fishing vessels are required to complete a Coast Guard-approved training course. Students can expedite their entrance into these occupations by enrolling in 2-year vocational-technical programs offered by secondary schools. In addition, some community colleges and universities offer fishery technology and related programs that include courses in seamanship, vessel operations, marine safety, navigation, vessel repair and maintenance, health emergencies, and fishing gear technology. Courses include hands-on experience. Secondary and postsecondary programs are normally offered in or near coastal areas.

Experienced fishers may find short-term workshops offered through various postsecondary institutions especially useful. These programs provide a good working knowledge of electronic equipment used in navigation and communication, and the latest improvements in fishing gear.

Captains and mates on large fishing vessels of at least 200 gross tons must be licensed. Captains of sport fishing boats used for charter, regardless of size, must also be licensed. Crew members on certain fish processing vessels may need a merchant mariner's document. The U.S. Coast Guard issues these documents and licenses to individuals who meet the stipulated health, physical, and academic requirements. (For information about merchant marine occupations, see the statement on water transportation occupations elsewhere in the *Handbook*.)

Fishers must be in good health and possess physical strength. Good coordination, mechanical aptitude, and the ability to work under difficult or dangerous conditions are necessary to operate, maintain, and repair equipment and fishing gear. Fishers need stamina to work long hours at sea, often under difficult conditions. On large vessels, they must be able to work as members of a team. Fishers must be patient, yet always alert, to overcome the boredom of long watches, when not engaged in fishing operations. The ability to assume any deckhand's functions, on short notice, is important. As supervisors, mates must be able to assume all duties, including the captain's, when necessary. The captain must be highly experienced, mature, decisive, and possess the business skills needed to run business operations.

On fishing vessels, most fishers begin as deckhands. Deckhands who acquire experience and whose interests are in ship engineering—maintenance and repair of ship engines and equipment—can eventually become licensed chief engineers on large commercial vessels, after meeting the Coast Guard's experience, physical, and academic requirements. Experienced, reliable deckhands who display supervisory qualities may become boatswains. Boatswains may, in turn, become second mates, first mates, and finally captains. Almost all captains become self-employed, and the overwhelming majority eventually own, or have an interest in, one or more fishing ships. Some may choose to run a sport or recreational fishing operation. When their seagoing days are over, experienced individuals may work in or, with the necessary capital, own stores selling fishing and marine equipment and supplies. Some captains may assume advisory or administrative positions in industry trade associations or government offices, such as harbor development commissions or in teaching positions in industry-sponsored workshops or educational institutions. Divers in fishing operations can enter commercial diving activity—for example, repairing ships or maintaining piers and marinas—usually after completion of a certified training program sponsored by an educational institution or industry association.

Job Outlook

Employment of fishers and fishing vessel operators is expected to decline through the year 2010. These occupations depend on the natural ability of fish stocks to replenish themselves through growth and reproduction, as well as on governmental regulation of fisheries. Many operations are currently at or beyond maximum sustainable yield, partially because of habitat destruction, and the number of workers who can earn an adequate income from fishing is expected to decline. Job openings will arise from the need to replace workers who retire or leave the occupation. Some fishers and fishing vessel operators leave the occupation because of the strenuous and hazardous nature of the job and the lack of steady, year-round income.

In many areas, particularly the North Atlantic and Pacific Northwest, damage to spawning grounds and excessive fishing have adversely affected the stock of fish and, consequently, the employment opportunities for fishers. In some areas, States have greatly reduced permits to fishers, to allow stocks of fish and shellfish to replenish themselves, idling many fishers. Other factors contributing to the projected decline in employment of fishers include the use of sophisticated electronic equipment for navigation, communication, and fish location; improvements in fishing gear, which have greatly increased the efficiency of fishing operations; and the use of highly automated floating processors, where the catch is processed aboard the vessel. Sport fishing boats will continue to provide some job opportunities.

Earnings

The majority of fishers earn between $300 and $750 per week. Earnings of fishers and fishing vessel operators normally are highest in the summer and fall—when demand for services peaks and environmental conditions are favorable—and lowest during the winter. Many full-time and most part-time workers supplement their income by working in other activities during the off-season. For example, fishers may work in seafood processing plants, establishments selling fishing and marine equipment, or in construction, or in a number of non-related, seasonal occupations.

Earnings of fishers vary widely, depending upon their position, ownership percentage of the vessel, size of ship, and the amount and value of the catch. The costs of the fishing operation—the physical aspects of operating the ship such as the fuel costs, repair and maintenance of gear and equipment, and the crew's supplies—are deducted from the sale of the catch. Net proceeds are distributed among the crew members in accordance with a prearranged percentage. Generally, the ship's owner—usually its captain—receives half of the net proceeds. From this, the owner pays for depreciation, maintenance and repair, replacement and insurance costs of the ship and equipment; the money remaining is the owner's profit.

Related Occupations

Other occupations that involve outdoor work with fish and watercraft include water transportation occupations and fish and game wardens.

Sources of Additional Information

Names of postsecondary schools offering fishing and related marine educational programs are available from:

➤ Marine Technology Society, 1828 L St. NW., Suite 906, Washington, DC 20036-5104. Internet: **http://www.mtsociety.org**

Information on licensing of fishing vessel captains and mates, and requirements for merchant mariner documentation, is available from the U.S. Coast Guard Marine Inspection Office or Marine Safety Office in your State, or:

➤ Office of Compliance, Commandant (G-MOC-3) 2100 Second St. SW., Washington, DC 20593.

➤ Licensing and Evaluation Branch, National Maritime Center, 4200 Wilson Blvd., Suite 630, Arlington, VA 22203-1804.

Forest, Conservation, and Logging Workers

(O*NET 45-4011.00, 45-4021.00, 45-4022.01, 45-4023.00)

Significant Points

- Workers spend all their time outdoors, sometimes in poor weather and often in isolated areas.
- Most jobs are physically demanding and can be hazardous.
- A small decline is expected in overall employment.

Nature of the Work

The Nation's forests are a rich natural resource, providing beauty and tranquillity, varied recreational areas, and wood for commercial use. Managing forests and woodlands requires many different kinds of workers. Forest and conservation workers help develop, maintain, and protect these forests by growing and planting new tree seedlings, fighting insects and diseases that attack trees, and helping to control soil erosion. Timber cutting and logging workers harvest thousands of acres of forests each year for the timber that provides the raw material for countless consumer and industrial products.

Forest and conservation workers perform a variety of tasks to reforest and conserve timberlands and maintain forest facilities, such as roads and campsites. Some forest workers, called tree planters, use digging and planting tools called "dibble bars" and "hoedads" to plant tree seedlings to reforest timberland areas. Forest workers also remove diseased or undesirable trees with a powersaw or handsaw and spray trees with insecticides to kill insects and to protect against disease and herbicides to reduce competing vegetation. Forest workers in private industry usually work for professional foresters and paint boundary lines, assist with prescribed burning, and aid in tree marking and measuring by keeping a tally of the trees examined and counted. Those who work for State and local governments or under contract to the Federal Government also clear away brush and debris from jurisdictional camp trails, roadsides, and camping areas. Some clean kitchens and restrooms at recreational facilities and campgrounds.

Other forest and conservation workers work in forest nurseries, sorting out tree seedlings and discarding those that do not meet prescribed standards of root formation, stem development, and foliage condition.

Some forest workers are employed on tree farms, where they plant, cultivate, and harvest many different kinds of trees. Duties vary depending on the type of tree farm. Those who work on specialty farms, such as those growing Christmas or ornamental trees for nurseries, are responsible for shearing tree tops and limbs to control growth, increase limb density, and improve tree shape. In addition, duties include planting, spraying to control surrounding weed growth and insects, and harvesting.

Other forest workers gather, by hand or using hand tools, products from the woodlands such as decorative greens, tree cones and barks, moss, and other wild plant life. Still others tap trees for sap to make syrup or to produce chemicals.

The timber cutting and logging process is carried out by a variety of workers who make up a logging crew. *Fallers* cut down trees with hand-held power chain saws or occasionally axes. Usually using gas-powered chain saws, *buckers* trim off the tops and branches and buck (cut) the resulting logs into specified lengths.

Choke setters fasten chokers (steel cables or chains) around logs to be skidded (dragged) by tractors or forwarded by the cable yarding system to the landing or deck area where logs are separated by species and product type, such as pulpwood, sawlogs, or veneer logs, and loaded onto trucks. *Rigging slingers* and *chasers* set up and dismantle the cables and guy wires of the cable yarding system. *Log sorters*, *markers*, *movers*, and *debarkers* sort, mark, and move logs, based on species, size, and ownership, and tend machines that debarks logs.

Logging equipment operators on a logging crew perform a number of duties. They drive crawler or wheeled tractors called skidders, or forwarders, which drag or transport logs from the felling site in the woods to the log landing area for loading. They operate grapple loaders, which lift and load logs into trucks, and tree fellers or shears, which cut the trees. They use tree harvesters to shear the tops off of trees, cut and limb the trees, and then cut the logs into desired lengths. Some logging equipment operators use tracked or wheeled equipment similar to a forklift to unload logs and pulpwood off trucks or gondola railroad cars, usually in a sawmill or pulpmill woodyard.

Log graders and *scalers* inspect logs for defects, measure logs to determine their volume, and estimate the marketable content or value of logs or pulpwood. These workers often use hand-held data collection terminals to enter data about individual trees, which can later be downloaded or sent, via modem, from the scaling area to a central computer.

Other timber cutting and logging workers have a variety of responsibilities. Some workers hike through forests to assess logging conditions. Laborers clear areas of brush and other growth to prepare for logging activities or to promote growth of desirable species of trees.

The timber cutting and logging industry is characterized by a large number of small crews of four to eight workers. A typical crew might consist of one or two fallers or one feller machine operator, one bucker, two logging tractor operators to drag cut trees to the loading deck, and one equipment operator to load the logs

Forest, conservation, and logging workers spend most of their time outdoors, often operating heavy logging equipment.

onto trucks. Most crews work for self-employed logging contractors who possess substantial logging experience, the capital to purchase equipment, and skills needed to run a small business successfully. Most contractors work alongside their crews as working supervisors and often operate one of the logging machines, such as the grapple loader or the tree harvester. Many manage more than one crew and function as owner-supervisors.

Although timber cutting and logging equipment has greatly improved and operations are becoming increasingly mechanized, many logging jobs are still labor intensive. These jobs require various levels of skill, ranging from the unskilled task of manually moving logs, branches, and equipment to skillfully using chain saws, peavies (hooked poles), and log jacks to cut and position logs for further processing or loading. To keep costs down, some timber cutting and logging workers maintain and repair the equipment they use. A skillful, experienced logger is expected to handle a variety of logging operations.

Working Conditions

Forestry and logging jobs are physically demanding. These workers spend all their time outdoors, sometimes in poor weather and often in isolated areas. The increased use of enclosed machines has decreased some of the discomforts caused by inclement weather. A few lumber camps in Alaska house workers in bunkhouses or company towns. Workers in sparsely populated western States commute long distances between their homes and logging sites. In the more densely populated eastern and southern States, commuting distances are much shorter.

Most logging occupations involve lifting, climbing, and other strenuous activities, although machinery has eliminated some of the heavy labor. Loggers work under unusually hazardous conditions. Falling trees and branches are a constant menace, as are the dangers associated with log handling operations and use of sawing equipment, especially delimbing devices. Special care must be taken during strong winds, which can even halt operations. Slippery or muddy ground and hidden roots or vines not only reduce efficiency but also present a constant danger, especially in the presence of moving vehicles and machinery. Poisonous plants, brambles, insects, snakes, and heat and humidity are minor annoyances. If safety precautions are not taken, the high noise level of sawing and skidding operations over long periods of time may impair hearing. Experience, exercise of caution, and use of proper safety measures and equipment—such as hardhats, eye and ear protection, and safety clothing and boots—are extremely important to avoid injury.

The jobs of forest and conservation workers generally are much less hazardous. It may be necessary for some forestry aides or forest workers to walk long distances through densely wooded areas to do their work.

Employment

Forest, conservation, and logging workers held about 90,000 jobs in 2000, distributed among the following occupations:

Logging equipment operators	47,000
Forest and conservation workers	21,000
Fallers	13,000
Log graders and scalers	8,000

Additional employment of choke setters, buckers, rigging slingers, and other logging workers is not included in the employment above.

Most wage and salary fallers and logging equipment operators are employed in the logging camps and logging contractors industry, although some work in sawmills and planing mills. Employment of log graders and scalers is largely concentrated in sawmills and planing mills. Although logging operations are found in most States, the Southeast employs the most, about 37 percent of all logging workers, followed by the Northwest, which employs 30 percent.

About 2 in 5 wage and salary forest and conservation workers are employed by companies that operate timber tracts, tree farms, or forest nurseries, or for establishments that supply forestry services. Some of those employed in forestry services work on a contract basis for the U.S. Department of Agriculture's Forest Service. Most of the remainder of forest and conservation workers are employed by State or local governments; about 4,300 work for State governments, and 1,900 work for local governments. A small number work in sawmills and planing mills. Although forest and conservation workers are located in every State, employment is concentrated in the West and Southeast where many national and private forests and parks are located.

Self-employed forestry, conservation, and logging workers account for about 1 of every 5 logging workers—a much higher proportion of self-employment than for most occupations.

Seasonal demand for forest, conservation, and logging workers varies by region. For example, in the northern States, winter work is common because the frozen ground facilitates logging. In the Southeast, logging and related activities occur year round.

Training, Other Qualifications, and Advancement

Most forest, conservation, and logging workers develop skills through on-the-job training with instruction coming primarily from experienced workers. Logging workers must familiarize themselves with the character and potential dangers of the forest environment and the operation of logging machinery and equipment. However, large logging companies and trade associations, such as the Northeastern Loggers Association and the Forest Resources Association, Inc., offer special programs, particularly for workers training to operate large, expensive machinery and equipment. Often, a representative of the manufacturer or company spends several days in the field explaining and overseeing the operation of newly purchased machinery. Safety training is a vital part of instruction for all logging workers.

Many State forestry or logging associations provide training sessions for fallers, whose job duties require more skill and experience than other positions on the logging team. Sessions may take place in the field, where trainees, under the supervision of an experienced logger, have the opportunity to practice various felling techniques. Fallers learn how to manually cut down extremely large or expensive trees safely and with minimal damage to the felled or surrounding trees.

Training programs for loggers are becoming common in many States, in response to a collaborative effort by the American Forest and Paper Association and others in the forestry industry. Such programs are designed to encourage the health and productivity of the Nation's forests through the Sustainable Forest Initiative (SFI) program. Logger training programs vary by State, but generally include some type of classroom or field training in a number of areas—best management practices, safety, endangered species, reforestation, and business management. Some programs lead to logger certification.

Experience in other occupations can expedite entry into some logging occupations. For example, equipment operators, such as truck drivers and bulldozer and crane operators, can assume skidding and yarding functions. Some loggers have worked in sawmills or on family farms with extensive wooded areas. Some logging contractors were formerly crew members of family-owned businesses operated over several generations.

Generally, little formal education is required for most forest, conservation, and logging occupations. Many secondary schools, including vocational and technical schools, and some community colleges offer courses or a 2-year degree in general forestry, wildlife, conservation, and forest harvesting, which could be helpful in obtaining a job. A curriculum that includes field trips to observe or participate in forestry or logging activities provides a particularly good background. There are no educational requirements for forest worker jobs. Many of these workers are high school or college students who are hired on a part-time or seasonal basis to perform short-term, labor-intensive tasks, such as planting tree seedlings.

Forest, conservation, and logging workers must be in good health and able to work outdoors every day. They also must be able to work as part of a team. Many logging occupations require physical strength and stamina. Maturity and good judgment are important in making quick, intelligent decisions in dealing with hazards as they arise. Mechanical aptitude and coordination are necessary qualities for operators of machinery and equipment, who often are responsible for repair and maintenance as well. Initiative and managerial and business skills are necessary for success as a self-employed logging contractor.

Experience working at a nursery or as a laborer can be useful in obtaining a job as a forest or conservation worker. Logging workers generally advance from occupations involving primarily manual labor to those involving the operation of expensive, sometimes complicated, machinery and other equipment. Inexperienced entrants usually begin as laborers, who carry tools and equipment, clear brush, and load and unload logs and brush. For some, familiarization with logging operations may lead to jobs such as log handling equipment operator. Further experience may lead to jobs involving the operation of more complicated machinery and yarding towers to transport, load, and unload logs. Those who have the motor skills required for the efficient use of power saws and other equipment may become fallers and buckers.

Job Outlook

Overall employment of forest, conservation, and logging workers is expected to decline slightly through the year 2010. Most job openings will result from replacement needs. Many logging workers are older and will retire, or transfer to other jobs that are less physically demanding and dangerous. In addition, some forestry workers are young workers who are not committed to the occupation on a long-term basis. Some take jobs to earn money for school; others only work in this occupation until they find a better paying job.

Slower-than-average employment growth is expected for forest and conservation workers. Environmental concerns may spur limited demand for these workers, especially at the State and local government levels. If more land is set aside to protect natural resources or wildlife habitats, more forest and conservation workers will be needed to maintain these lands.

Despite steady demand for lumber and other wood products, employment of timber cutting and logging occupations is expected to decline. Forest conservation efforts may restrict the volume of public timber available for harvesting, particularly in Federal forests in the West and Northwest, dampening demand for timber cutting and logging workers. The best job opportunities will be with privately owned forests and tree farms, which are not subject to the same restrictions in timber harvesting as forests on Federal land. Domestic timber producers also face increasing competition from foreign producers who can harvest the same amount of timber at lower cost. As competition increases, the logging industry is expected to continue to consolidate in order to reduce costs, eliminating some jobs.

Increased mechanization of logging operations and improvements in logging equipment will also continue to depress demand for many timber cutting and logging workers. Employment of fallers, buckers, choke setters, and other workers—whose jobs are labor intensive—should decline, as safer, laborsaving machinery and other equipment are increasingly used. Employment of machinery and equipment operators, such as logging tractor and log handling equipment operators, should be less adversely affected.

Weather can force curtailment of logging operations during the muddy spring season and cold winter months, depending on the geographic region. Changes in the level of construction, particularly residential construction, also affect logging activities in the short term. In addition, logging operations must be relocated when timber harvesting in a particular area has been completed. During prolonged periods of inactivity, some workers may stay on the job to maintain or repair logging machinery and equipment; others are forced to find jobs in other occupations or be without work.

Earnings

Earnings vary depending on the particular forestry or logging occupation and experience, ranging from the minimum wage in some beginning forestry and conservation positions to about $27.00 an hour for some experienced fallers. Median hourly earnings in 2000 for forest, conservation, and logging occupations were as follows:

Log graders and scalers	$13.07
Fallers	12.33
Logging equipment operators	12.07
Forest and conservation workers	8.97

Earnings of logging workers vary by size of establishment and by geographic area. Workers in the largest establishments earn more than those in the smallest establishments. Workers in Alaska and the Northwest earn more than those in the South, where the cost of living is generally lower.

Forest and conservation workers who work for State and local governments and large private firms generally enjoy more generous benefits than workers in smaller firms. Small logging contractors generally offer timber cutting and logging workers few benefits. However, some employers offer full-time workers basic benefits, such as medical coverage, and provide safety apparel and equipment.

Related Occupations

Other occupations concerned with the care of trees and their environment include conservation scientists and foresters, forest and conservation technicians, and grounds maintenance workers. Logging equipment operators have skills similar to material moving equipment operators, such as industrial truck and tractor operators and crane and tower operators.

Sources of Additional Information

For information about timber cutting and logging careers and secondary and postsecondary programs offering training for logging occupations, contact:

➤ Northeastern Loggers Association, P.O. Box 69, Old Forge, NY 13420. Internet: **http://www.loggertraining.com**

➤ Forest Resources Association, Inc., 600 Jefferson Plaza, Suite 350, Rockville, MD 20852. Internet: **http://www.forestresources.org**

For information on the Sustainable Forestry Initiative (SFI) training programs, contact:

➤ American Forest and Paper Association, 1111 19th St. NW., Suite 800, Washington, DC 20036. Internet: **http://www.afandpa.org**

Schools of forestry at States' land-grant colleges or universities also should be able to provide useful information.

A list of State forestry associations and other forestry-related State associations is available at most public libraries.

Material Moving Occupations

(O*NET 53-1021.00, 53-7011.00, 53-7021.00, 53-7031.00, 53-7032.01, 53-7032.02, 53-7033.00, 53-7041.00, 53-7051.00, 53-7061.00, 53-7062.01, 53-7062.02, 53-7062.03, 53-7063.00, 53-7064.00, 53-7071.01, 53-7071.02, 53-7072.00, 53-7073.00, 53-7081.00, 53-7111.00, 53-7121.00, 53-7199.99)

Significant Points

- Job openings should be numerous because the occupation is very large.
- Most jobs require little work experience or specific training, but earnings are low.
- Pay is highest in jobs that require the most experience or that have the greatest responsibilities, but seasonal work may reduce earnings.

Nature of the Work

Material moving workers are categorized into two groups: operators and laborers. Operators use machinery to move construction materials, earth, petroleum products, and other heavy materials. Generally, they move materials over short distances—around a construction site, factory, or warehouse. Some move materials on or off trucks and ships. Operators control equipment by moving levers or foot pedals, operating switches, or turning dials. They may also set up and inspect equipment, make adjustments, and perform minor repairs when needed. Laborers and hand material movers manually handle freight, stock, or other materials; clean vehicles, machinery, and other equipment; feed materials into or remove materials from machines or equipment; and pack or package products and materials.

Material moving occupations are classified by the type of equipment they operate or goods they handle. Each piece of equipment requires different skills to move different types of loads. (For information on *operating engineers; paving, surfacing, and tamping equipment operators; and pile-driver operators,* see the statement on construction equipment operators, elsewhere in the *Handbook*.)

Industrial truck and tractor operators drive and control industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, or construction site. A typical industrial truck, often called a forklift or lift truck, has a hydraulic lifting mechanism and forks. They also may operate tractors that pull trailers loaded with materials, goods, or equipment within factories and warehouses, or around outdoor storage areas.

Excavating and loading machine and dragline operators operate or tend machinery equipped with scoops, shovels, or buckets, to dig and load sand, gravel, earth, or similar materials into trucks or onto conveyors. Construction and mining industries employ the majority of excavation and loading machine and dragline operators.

Crane and tower operators operate mechanical boom and cable or tower and cable equipment to lift and move materials, machinery, or other heavy objects. They extend or retract a horizontally mounted boom to lower or raise a hook attached to the loadline. Most operators coordinate their maneuvers in response to hand signals and radioed instructions. Operators position the loads from the on-board console or from a remote console at the site. While crane and tower operators are noticeable at office building and other construction sites, the biggest group works in primary metal, metal fabrication, and transportation equipment manufacturing industries that use heavy, bulky materials.

Hoist and winch operators control movement of cables, cages, and platforms to move workers and materials for manufacturing, logging, and other industrial operations. They work in such positions as derrick operators and hydraulic boom operators. One half of all jobs for hoist and winch operators were found in manufacturing or construction industries.

Pump operators and their helpers tend, control, or operate power-driven pumps and manifold systems that transfer gases, oil, or other materials to vessels or equipment. They maintain the equipment to regulate the flow of materials according to a schedule set up by petroleum engineers and production supervisors.

Gas compressor and gas pumping station operators operate steam, gas, electric motor, or internal combustion engine driven compressors. They transmit, compress, or recover gases, such as butane, nitrogen, hydrogen, and natural gas. *Wellhead pumpers* operate power pumps and auxiliary equipment to produce flow of oil or gas from wells in oil fields.

Tank, car, truck and ship loaders operate ship loading and unloading equipment, conveyors, hoists, and other specialized material handling equipment such as railroad tank car unloading equipment. They may gauge or sample shipping tanks and test them for leaks. *Conveyor operators and tenders* control or tend conveyor systems that move materials to or from stockpiles, processing stations, departments, or vehicles.

Laborers and hand freight, stock, and material movers manually move materials or perform other unskilled general labor. These workers move freight, stock, and other materials to and from storage and production areas, loading docks, delivery vehicles, ships, and containers. Their specific duties vary by industry and work setting. Specialized workers within this group include baggage and cargo handlers, who work in transportation industries; and truck loaders and unloaders. In factories, they may move raw materials, components, and finished goods between loading docks, storage areas, and work areas. They receive and sort materials and supplies and prepare them according to work orders for delivery to work or storage areas.

Hand packers and *packagers* manually pack, package, or wrap a variety of materials. They may inspect items for defects, label cartons, stamp information on products, keep records of items packed, and stack packages on loading docks. This group also includes order fillers, who pack materials for shipment, as well as grocery store courtesy clerks. In grocery stores, they may bag groceries, carry packages to customers' cars, and return shopping carts to designated areas.

Machine feeders and *offbearers* feed materials into or remove materials from automatic equipment or machines tended by other workers. *Cleaners of vehicle and equipment* clean machinery, vehicles, storage tanks, pipelines, and similar equipment using water and other cleaning agents, vacuums, hoses, brushes, cloths, and other cleaning equipment. *Refuse* and *recyclable material collectors* gather trash, garbage, and recyclables from homes and businesses along a regularly scheduled route, and deposit the refuse in their truck for transport to a dump, landfill, or recycling center. They lift and empty garbage cans or recycling bins by hand, or operate a hydraulic lift truck that picks up and empties dumpsters.

Some operators move materials between trucks and ships.

Working Conditions

Many material moving workers work outdoors in every type of climate and weather condition. The work tends to be repetitive and physically demanding. They may lift and carry heavy objects, and stoop, kneel, crouch, or crawl in awkward positions. Some work at great heights, or outdoors in all weather conditions. Some jobs expose workers to harmful materials or chemicals, fumes, odors, loud noise, or dangerous machinery. To avoid injury, these workers wear safety clothing, such as gloves and hard hats, and devices to protect their eyes, mouth, or hearing. These jobs have become much safer as safety equipment such as overhead guards on forklift trucks has become common. As with most machinery, most accidents can be avoided by observing proper operating procedures and safety practices.

Material movers generally work 8-hour shifts, though longer shifts are also common. In many industries that work around the clock, material movers work evening or "graveyard" shifts. Some may work at night because the establishment may not want to disturb customers during normal business hours. Refuse and recyclable material collectors often work shifts starting at 5:00 or 6:00 a.m. Some material movers only work during certain seasons, such as when the weather permits construction activity.

Employment

Material movers held about 5 million jobs in 2000. They were distributed among the detailed occupations as follows:

Laborers and freight, stock, and material movers, hand	2,084,000
Hand packers and packagers	1,091,000
Industrial truck and tractor operators	635,000
Cleaners of vehicles and equipment	322,000
Machine feeders and offbearers	182,000
First-line supervisors/managers of helpers, laborers, and material movers, hand	153,000
Refuse and recyclable materials collectors	124,000
Excavating and loading machine and dragline operators	76,000
Conveyer operators and tenders	63,000
Crane and tower operators	55,000
Tank, car, truck, and ship loaders	19,000
Pump operators, except wellhead pumpers	14,000
Wellhead pumpers	12,000
Hoist and winch operators	9,000
Gas compressor and gas pumping station operators	7,000
All other material moving workers	142,000

More than 44 percent of all material movers worked in transportation, public utilities, wholesale trade, or retail trade industries. Another 26 percent worked in manufacturing. Significant numbers of material movers also worked in construction, mining, and service industries. A small proportion of material movers were self-employed. A growing number are employed on a temporary or contract basis, many through firms providing personnel supply services. For example, companies that only need workers for a few days to move materials or clean up a site may contract with temporary help agencies specializing in providing this type of worker on a short-term basis.

Material movers work in every part of the country. Some work in remote locations on large construction projects, such as highways and dams, or in factory or mining operations.

Training, Other Qualifications, and Advancement

Most material moving jobs require no work experience or specific training. Some employers prefer applicants with a high school diploma, but most simply require workers to be at least 18 years old and physically able to perform the work. For those jobs requiring physical exertion, employers may require that applicants pass a physical exam. Some employers also require drug testing or background checks before employment. These workers often are younger than workers in other occupations—reflecting the limited training but significant physical requirements of many of these jobs.

Material movers generally learn skills informally, on the job from more experienced workers or supervisors. However, workers who use dangerous equipment or handle toxic chemicals usually receive specialized training in safety awareness and procedures. Many of the training requirements are standardized through the U.S. Occupational Safety and Health Administration (OSHA).

Material moving equipment operators need a good sense of balance, distance judgment, and eye-hand-foot coordination. For those jobs that involve dealing with the public, such as grocery store courtesy clerks, workers should be pleasant and courteous. Most jobs require reading and basic mathematics skills to read procedures manuals, billing, and other documents. Mechanical aptitude and high school training in automobile or diesel mechanics are helpful because workers may perform some maintenance on their equipment. Experience operating mobile equipment, such as farm tractors or heavy equipment in the Armed Forces, is an asset.

Experience in many of these jobs may allow workers to qualify or become trainees for other skilled positions such as construction trades workers; assemblers or other production workers; motor vehicle operators; or vehicle and mobile equipment mechanics, installers, and repairers. In fact, many employers prefer to promote qualified material movers as openings arise. Some may eventually advance to become supervisors.

Job Outlook

Employment in material moving occupations will increase about as fast as average for all occupations through 2010. Employment growth will stem from an expanding economy and increased spending on the Nation's infrastructure of highways, bridges, and dams. However, equipment improvements, including the growing automation of material handling in factories and warehouses, will continue to raise productivity and moderate the demand for material movers.

Job growth for material movers largely depends on growth in the industries employing them and the type of equipment the workers operate or the materials they handle. For example, employment

of operators in manufacturing will decline slightly due to increased automation and efficiency in the production process. On the other hand, employment will grow rapidly in temporary help organizations as firms contract out material moving services.

Job openings should be numerous because the occupation is very large and turnover is relatively high—characteristic of occupations requiring little formal training. Many openings will arise from the need to replace workers who retire, transfer to other occupations, or leave the labor force for other reasons.

Both construction and manufacturing are very sensitive to changes in economic conditions, so the number of job openings in these industries may fluctuate from year to year.

Earnings

Median hourly earnings of material moving workers in 2000 were as follows:

Gas compressor and gas pumping station operators	$20.32
Pump operators, except wellhead pumpers	17.16
First-line supervisors/managers of helpers, laborers, and material movers, hand	16.73
Wellhead pumpers	16.35
Crane and tower operators	15.89
Excavating and loading machine and dragline operators	14.94
Hoist and winch operators	14.40
Tank, car, truck, and ship loaders	13.78
Refuse and recyclable materials collectors	11.83
Industrial truck and tractor operators	11.74
Conveyer operators and tenders	10.70
Machine feeders and offbearers	9.69
Laborers and freight, stock, and material movers, hand	9.04
Cleaners of vehicles and equipment	7.55
Hand packers and packagers	7.53

Pay rates vary according to experience and job responsibilities. Pay usually is higher in metropolitan areas. Seasonal work may reduce earnings.

Related Occupations

Other workers who operate mechanical equipment include busdrivers; construction equipment operators; machine setters, operators, and tenders—metal and plastic; rail transportation workers; and truckdrivers and driver/sales workers. Other entry-level workers who perform mostly physical work are agricultural workers; building cleaning workers; construction laborers; forest, conservation, and logging workers; and grounds maintenance workers.

Sources of Additional Information

For information about job opportunities and training programs, contact local State employment service offices, building or construction contractors, manufacturers, and wholesale and retail establishments.

Information on safety and training requirements is available from:

➤ U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 200 Constitution Ave. NW., Washington, D.C. 20210. Internet: **http://www.osha.gov**

Information on industrial truck and tractor operators is available from:

➤ Industrial Truck Association, 1750 K St. NW., Suite 460, Washington, DC 20006.

➤ Specialized Carriers and Rigging Association, 2750 Prosperity Ave., Suite 620, Fairfax, VA 22301.

Rail Transportation Occupations

(O*NET 53-4011.00, 53-4012.00, 53-4013.00, 53-4021.01, 53-4021.02, 53-4031.00, 53-4041.00, 53-4099.99)

Significant Points

- Overall employment in the railroad transportation industry is expected to decline due to productivity gains.
- Employment of locomotive engineers is projected to grow slowly, but all other rail transportation occupations are projected to decline.
- Nearly 8 out of 10 rail transportation workers are members of unions and many have relatively high earnings.

Nature of the Work

More than a century ago, freight and passenger railroads were the ties binding the Nation together and the engine driving the economy. Today, rail transportation remains a vital link in our Nation's transportation network and economy. Railroads deliver billions of tons of freight and thousands of travelers to destinations throughout the Nation, while subways and streetcars transport millions of passengers within metropolitan areas.

Locomotive engineers are among the most experienced and skilled workers on the railroad. Locomotive engineers operate large trains carrying cargo and passengers between stations. Most engineers run diesel locomotives, while a few operate electrically powered locomotives.

Before and after each run, engineers check the mechanical condition of their locomotive, and make minor adjustments on the spot. Engineers receive starting instructions from conductors and move controls such as throttles and air brakes to drive the locomotive. They monitor gauges and meters that measure speed, amperage, battery charge, and air pressure both in the brakelines and in the main reservoir.

On the open rail and in the yard, engineers confer with conductors and traffic control center personnel via two-way radio or mobile telephone to issue or receive information concerning stops, delays, and train locations. They interpret and comply with train orders, train signals, speed limits, and railroad rules and regulations. They must have a thorough knowledge of the signaling systems, yards, and terminals on routes over which they operate. Engineers must be constantly aware of the condition and makeup of their train. This is extremely important because trains react differently to acceleration, braking, and curves, depending on the grade and condition of the rail, number of cars, ratio of empty to loaded cars, and amount of slack in the train.

Locomotive firers, or *assistant engineers,* monitor instruments during runs and watch for dragging equipment, track obstructions, and train signals. In rail yards, they watch for and relay traffic signals from yard workers to yard engineers. *Rail yard engineers, dinkey operators, and hostlers* drive switching or small "dinkey" engines within railroad yards, industrial plants, mines and quarries, or construction projects.

Railroad conductors coordinate the activities of freight and passenger train crews. Railroad conductors assigned to freight trains review schedules, switching orders, way bills, and shipping records to obtain cargo loading and unloading information. Conductors assigned to passenger trains ensure passenger safety and comfort. They collect tickets and fares, and coordinate crew activities to provide boarding, porter, maid, and meal services.

Before a train leaves the terminal, the conductor and engineer discuss instructions received from the dispatcher concerning the train's route, timetable, and cargo. During the run, conductors use two-way radios and mobile telephones to communicate with dispatchers, engineers, and conductors of other trains. Conductors receive information from dispatch or electronic monitoring devices that relay any equipment problems on the train or the rail. They may arrange for the removal of defective cars from the train for repairs at the nearest station or stop. Additionally, conductors may discuss alternative routes if there is a defect or obstruction on the rail.

Yardmasters coordinate activities of workers engaged in railroad traffic operations. These activities include the makeup or breakup of trains and switching inbound or outbound traffic to a specific section of the line. Some cars are sent to unload their cargo on special tracks, while other cars are moved to other tracks to await assemblage into new trains destined for different cities. Yardmasters inform engineers where to move the cars to fit the planned train configuration. Computerized switches divert the locomotive or cars to the proper track for coupling and uncoupling.

Other *railroad brake, signal, and switch operators* perform a variety of activities such as operating track switches to route cars to different sections of the yard. They may signal engineers and set warning signals, help couple and uncouple rolling stock to make up or break up trains, or inspect couplings, air-hoses, and hand brakes.

Traditionally, freight train crews included either one or two brake operators—one in the locomotive with the engineer and the firer and another who rode with the conductor in the rear car. Brake operators worked under the direction of conductors and did the physical work involved in adding and removing cars at railroad stations and assembling and disassembling trains in railroad yards. In an effort to reduce costs and take advantage of new technology, most railroads have phased out locomotive firers and brake operators. Many modern freight trains only use an engineer and a conductor, stationed with the engineer, because new visual instrumentation and monitoring devices have eliminated the need for crewmembers located at the rear of the train.

In contrast to other rail transportation workers, subway and streetcar operators generally work for public transit authorities instead of railroads. *Subway operators* control trains that transport passengers throughout a city and its suburbs. The trains run on rail-guided tracks in underground tunnels, on the surface, or on elevated platforms above streets. Operators must stay alert to observe signals along the track that indicate when they must start, slow, or stop their train. They also make announcements to riders, may open and close the doors, and ensure that passengers get on and off the subway safely.

Control center personnel communicate with other rail transportation workers via two-way radio or mobile telephone.

To meet predetermined schedules, operators must control the train's speed and the amount of time spent at each station. Increasingly, however, these functions are controlled by computers and not by the operator. When breakdowns or emergencies occur, operators contact their dispatcher or supervisor and may have to evacuate cars.

Streetcar operators drive electric-powered streetcars or trolleys that transport passengers in metropolitan areas. Some tracks may be recessed in city streets or have grade crossings, so operators must observe traffic signals and cope with car and truck traffic. Operators start, slow, and stop their cars so passengers may get on or off with ease. They may collect fares, and issue change and transfers. They also answer questions from passengers concerning fares, schedules, and routes.

Working Conditions

Many rail transportation employees work nights, weekends, and holidays because trains operate 24 hours a day, 7 days a week. Nearly 40 percent work more than a 40-hour workweek. Seniority usually dictates who receives the more desirable shifts.

Most freight trains are unscheduled, and few workers on these trains have scheduled assignments. Instead, workers place their names on a list and wait their turn to work. Jobs are usually handed out on short notice and often at odd hours. Those who work on trains operating between stations that are hundreds of miles apart may spend several nights at a time away from home.

Workers on passenger trains ordinarily have more regular and reliable shifts. The appearance, temperature, and accommodations of the passenger trains are also more comfortable than freight trains.

Rail yard workers spend most of their time outdoors in varying weather. The work of conductors and engineers on local runs, where trains frequently stop at stations to pick up and deliver cars, is physically demanding. Climbing up and down and getting off moving cars is strenuous and can be dangerous.

Employment

Rail transportation workers held 115,000 jobs in 2000—including 37,000 locomotive engineers and firers; 3,800 rail yard engineers, dinkey operators, and hostlers; 45,000 railroad conductors and yardmasters; and 22,000 railroad brake, signal, and switch operators. Railroads employ more than 92 percent of all rail transportation workers. The rest primarily work for local governments as subway and streetcar operators, and for mining and manufacturing establishments operating their own locomotives and dinkey engines that move rail cars containing ore, coal, and other bulk materials.

Training, Other Qualifications, and Advancement

Most railroad transportation workers begin as yard laborers, and later may have the opportunity to train for engineer or conductor jobs. Railroads require that applicants have a minimum of a high school diploma or equivalent. Applicants must have good hearing, eyesight, and color vision, as well as good hand-eye coordination, manual dexterity, and mechanical aptitude. Physical stamina is required for these entry-level jobs. Employers require railroad transportation job applicants to pass a physical examination and drug and alcohol screening. Under Federal law, all train crewmembers are subject to random drug and alcohol testing while on duty.

Applicants for locomotive engineer jobs must be at least 21 years old. Frequently, employers fill engineer positions with workers who have experience in other railroad operating occupations. Federal regulations require beginning engineers to complete a formal engineer training program, including classroom, simulator, and

hands-on instruction in locomotive operation. The instruction is usually administered by the rail company in programs approved by the Federal Railroad Administration. At the end of the training period, they must pass a hearing and visual acuity test, a safety conduct background check, a railroad operation knowledge test, and a skills performance test. The company issues the engineer a license after the applicant successfully passes the examinations. Other conditions and rules may apply to entry-level engineers, and these rules usually vary by employer.

To maintain certification, railroad companies must monitor their engineers. Additionally, engineers must periodically pass an operational rules efficiency test. The test is an unannounced event requiring engineers to take active or responsive action in certain situations such as maintaining a certain speed through a turn or yard.

Engineers undergo periodic physical examinations and drug and alcohol testing to determine their fitness to operate locomotives. In some cases, engineers who fail to meet these physical and conduct standards are restricted to yard service; in other instances, they may be disciplined, trained to perform other work, or discharged.

Conductor jobs are generally filled from the ranks of experienced rail transportation workers who have passed tests covering signals, timetables, operating rules, and related subjects. Seniority usually is the main factor in determining promotion to conductor. On some railroads, conductors start in the yards, then move to freight or passenger service.

Newly trained engineers and conductors are placed on the "extra board" until permanent positions become available. Extra board workers only receive assignments when the railroad needs substitutes for regular workers who are absent because of vacation, illness, or other personal reasons. Seniority rules may also allow workers with greater seniority to select their type of assignment. For example, an engineer may move from an initial regular assignment in yard service to road service.

For subway and streetcar operator jobs, subway transit systems prefer applicants with a high school education. Applicants also must be in good health, have good communication skills, and be able to make quick, responsible judgments.

New operators generally complete training programs that last from a few weeks to 6 months. At the end of the period of classroom and on-the-job training, operators usually must pass qualifying examinations covering the operating system, troubleshooting, and evacuation and emergency procedures. Some operators with sufficient seniority can advance to station managers or other supervisory positions.

Job Outlook

Competition for available opportunities is expected to be keen. Many persons qualify for rail transportation occupations because education beyond high school is generally not required. Many more desire employment than can be hired because the pay is good and the work steady.

Employment for a majority of railroad transportation occupations is expected to decline through the year 2010, with only locomotive engineers expected to grow. The need to replace workers who transfer to other occupations or retire will be the main source of job openings. Employment in most rail occupations, other than locomotive engineers, will continue to decline due to consolidation of railroads and job duties. To remain competitive with other modes of transportation, railroads will strive to control labor costs.

Demand for railroad freight service will grow as the economy and the intermodal transportation of goods expand. Intermodal systems use trucks to pick-up and deliver the shippers' sealed trailers or containers, and trains to transport them long distance. This saves customers time and money by efficiently carrying goods across the country. For railroads, the benefit has been the increased efficiency of equipment use, allowing increases in the number of runs each train makes in a year. In order to compete with other modes of transportation such as trucks, ships, and aircraft, railroads are improving delivery times and on-time service while reducing shipping rates. As a result, businesses are expected to increasingly use railroads to carry their goods.

However, growth in the number of railroad transportation workers will be adversely affected by innovations such as larger, faster, more fuel-efficient trains and computerized classification yards that make it possible to move freight more economically. Computers help keep track of freight cars, match empty cars with the closest loads, and dispatch trains. Computer-assisted devices alert engineers to train malfunctions and new work rules have become widespread allowing trains to operate with two- or three-person crews instead of the traditional five-person crews.

Earnings

Median hourly earnings of locomotive engineers were $21.26 in 2000. The middle 50 percent earned between $15.77 and $25.30 an hour. The lowest 10 percent earned less than $12.84, and the highest 10 percent earned more than $29.67 an hour.

Median hourly earnings of railroad conductors and yardmasters were $18.86 in 2000. The middle 50 percent earned between $15.47 and $22.08 an hour. The lowest 10 percent earned less than $12.92, and the highest 10 percent earned more than $31.03 an hour.

Median hourly earnings of railroad brake, signal, and switch operators were $18.82 in 2000. The middle 50 percent earned between $14.60 and $25.26 an hour. The lowest 10 percent earned less than $11.87, and the highest 10 percent earned more than $31.83 an hour.

Median hourly earnings of rail yard engineers, dinkey operators, and hostlers were $17.69 in 2000. The middle 50 percent earned between $14.43 and $20.38 an hour. The lowest 10 percent earned less than $11.70, and the highest 10 percent earned more than $24.66 an hour.

Most railroad workers in road service are paid according to miles traveled or hours worked; whichever leads to higher earnings. Full-time employees have steadier work, more regular hours, increased opportunities for overtime work, and higher earnings than do those assigned to the extra board.

According to the National Railroad Labor Conference (NRLC) in 1999, the average annual earnings for Class I railroad engineers ranged from $61,400 for yard-freight engineers, to $81,000 for passenger engineers. For conductors, earnings ranged from $53,500 for yard-freight conductors, up to $68,300 for passenger conductors. The NRLC reported that brake operators averaged from $40,800 for yard-freight operators, up to $58,700 for local-freight operators.

According to data from the American Public Transportation Association, in early 2001 the top-rate full-time hourly earnings of operators for commuter rail ranged from $17.50 to $30.10; operators for heavy rail from $16.20 to $27.70; and operators for light rail from $14.40 to $23.90. Transit workers in the northeastern United States typically had the highest wages.

Nearly 80 percent of railroad transportation workers are members of unions. Many different railroad unions represent various crafts on the railroads. Most railroad engineers are members of the Brotherhood of Locomotive Engineers, while most other railroad transportation workers are members of the United Transportation Union. Many subway operators are members of the Amalgamated Transit Union, while others belong to the Transport Workers Union of North America.

Related Occupations
Other related transportation workers include aircraft pilots and flight engineers, busdrivers, truckdrivers and driver/sales workers, and water transportation occupations.

Sources of Additional Information
To obtain information on employment opportunities, contact the employment offices of the various railroads and rail transit systems, or State employment service offices.

For general information about the rail transportation industry, contact:

➤ Association of American Railroads, 50 F St. NW., Washington, DC 20001. Internet: **http://www.aar.org**.

➤ Federal Railroad Administration, 400 7th St. SW., Washington, DC 20590. Internet: **http://www.fra.dot.gov**

For general information about career opportunities in passenger transportation, contact:

➤ American Public Transportation Association, 1666 K St. NW., Suite 1100, Washington, DC 20006. Internet: **http://www.apta.com**

General information on rail transportation occupations and career opportunities as a locomotive engineer is available from:

➤ Brotherhood of Locomotive Engineers, 1370 Ontario Ave., Cleveland, OH 44113-1702. Internet: **http://www.ble.org**

Taxi Drivers and Chauffeurs

(O*NET 53-3041.00)

Significant Points

- Taxi drivers and chauffeurs can work all schedules, including full-time, part-time, night, evening, and weekend work.
- Job opportunities will be good because replacement needs are high—many people work in these jobs for short periods.
- Many taxi drivers and chauffeurs like the independent, unsupervised work of driving their automobile.

Nature of the Work
Anyone who has been in a large city knows the importance of taxi and limousine service. *Taxi drivers*, also known as *cab drivers*, help passengers get to and from their homes, workplaces, and recreational pursuits such as dining, entertainment, and shopping. They also help out-of-town business people and tourists get around in new surroundings.

At the start of their driving shift, taxi drivers usually report to a taxicab service or garage where they are assigned a vehicle, most frequently a large, conventional automobile modified for commercial passenger transport. They record their name, work date, and cab identification number on a trip sheet. Drivers check the cab's fuel and oil levels, and make sure the lights, brakes, and windshield wipers are in good working order. Drivers adjust rear and side mirrors and their seat for comfort. Any equipment or part not in good working order is reported to the dispatcher or company mechanic.

Taxi drivers pick up passengers in one of three ways: cruising the streets to pick up random passengers; prearranged pickups; and pickups from taxi stands established in highly trafficked areas. In urban areas, the majority of passengers hail or "wave down" drivers cruising the streets. Customers may also prearrange a pickup by calling a cab company and giving a location, approximate pick up time, and destination. The cab company dispatcher then relays the information to a driver by two-way radio, cellular telephone, or on-board computer. Outside of urban areas, the majority of trips are dispatched in this manner. Drivers also pick up passengers waiting at cabstands or in taxi lines at airports, train stations, hotels, and other places where people frequently seek taxis.

Some drivers transport individuals with special needs, such as those with disabilities and the elderly. These drivers, also known as *paratransit drivers*, operate specially equipped vehicles designed to accommodate a variety of needs in nonemergency situations. Although special certification is not necessary, some additional training on the equipment and passenger needs may be required.

Drivers should be familiar with streets in the areas they serve so they can use the most efficient route to destinations. They should know the locations of frequently requested destinations, such as airports, bus and railroad terminals, convention centers, hotels, and other points of interest. In case of emergency, the driver should also know the location of fire and police stations and hospitals.

Upon reaching the destination, drivers determine the fare and announce it to the rider. Fares often consist of many parts. In many cabs, a taximeter measures the fare based on the length of the trip and the amount of time the trip took. Drivers turn the taximeter on when passengers enter the cab and turn it off when they reach the final destination. The fare also may include a surcharge for additional passengers, a fee for handling luggage, or a drop charge—an additional flat fee added for use of the cab. In some cases, fares are determined by a system of zones through which the taxi passes during a trip. Each jurisdiction determines the rate and structure of the fare system covering licensed taxis. Passengers generally add a tip or gratuity to the fare. The amount of the gratuity depends on the passengers' satisfaction with the quality and efficiency of the ride and courtesy of the driver. Drivers issue receipts upon request from the passenger. They enter onto the trip sheet all information regarding the trip, including the place and time of pick-up and drop-off and the total fee. These logs help check the driver's activity and efficiency. Drivers also must fill out accident reports when necessary.

Chauffeurs operate limousines, vans, and private cars for limousine companies, private businesses, government agencies, and wealthy individuals. This service differs from taxi service in that all trips are prearranged. Many chauffeurs transport customers in large vans between hotels and airports, bus, or train terminals. Others drive luxury automobiles, such as limousines, to business events, entertainment venues, and social events. Still others provide full-time personal transportation for wealthy families and private companies.

At the start of the workday, chauffeurs ready their automobiles or vans for use. They inspect the vehicle for cleanliness and, when needed, vacuum the interior and wash the exterior body, windows, and mirrors. They check fuel and oil levels and make sure the lights, tires, brakes, and windshield wipers work. Chauffeurs may perform routine maintenance and make minor repairs, such as changing tires or adding oil and other fluids when needed. If a vehicle requires more complicated repair, they take it to a professional mechanic.

Chauffeurs cater to passengers with attentive customer service and a special regard for detail. They help riders into the car by holding open doors, holding umbrellas when raining, and loading packages and luggage into the trunk of the car. They may perform errands for their employers such as delivering packages or picking up clients arriving at airports. Many chauffeurs offer conveniences and luxuries in their limousines to insure a pleasurable ride, such as newspapers, magazines, music, drinks, televisions, and telephones. A growing number of chauffeurs work as full-service executive

Taxi drivers should be familiar with streets in the areas they serve, so that they can use the most efficient routes to destinations.

assistants, simultaneously acting as driver, secretary, and itinerary-planner.

Working Conditions

Taxi drivers and chauffeurs occasionally have to load and unload heavy luggage and packages. Driving for long periods can be tiring and uncomfortable, especially in densely populated urban areas. Drivers must be alert to conditions on the road, especially in heavy and congested traffic or in bad weather. They must take precautions to prevent accidents and avoid sudden stops, turns, and other driving maneuvers that would jar passengers. Taxi drivers also risk robbery because they work alone and often carry large amounts of cash.

Work hours of taxi drivers and chauffeurs vary greatly. Some jobs offer full-time or part-time employment with work hours that can change from day to day or remain the same every day. It is often necessary for drivers to report to work on short notice. Chauffeurs who work for a single employer may be on call much of the time. Evening and weekend work are common for limousine and taxicab services.

The needs of the client or employer dictate the work schedule for chauffeurs. The work of taxi drivers is much less structured. Working free from supervision, they may break for a meal or a rest whenever their vehicle is unoccupied. This occupation is attractive to individuals seeking flexible work schedules, such as college and postgraduate students. Similarly, other service workers such as ambulance drivers and police officers often consider moonlighting as taxi drivers and chauffeurs.

Full-time taxi drivers usually work one shift a day, which may last from 8 to 12 hours. Part-time drivers may work half a shift each day, or work a full shift once or twice a week. Drivers may work shifts at all times of the day and night, because most taxi companies offer services 24 hours a day. Early morning and late night shifts are common. Drivers work long hours during holidays, weekends, and other special events that support heavier demand for their services. Independent drivers, however, often set their own hours and schedules.

Design improvements in newer cabs have reduced stress and increased the comfort and efficiency of drivers. Many regulators require standard amenities such as air conditioning and general upkeep of the vehicles. Modern taxicabs also are sometimes equipped with sophisticated tracking devices, fare meters, and dispatching equipment. Satellites and tracking systems link many of these state-of-the-art vehicles with company headquarters. In a matter of seconds, dispatchers can deliver directions, traffic advisories, weather reports, and other important communications to drivers anywhere in the transporting area. The satellite link-up also allows dispatchers to track vehicle location, fuel consumption, and engine performance. Drivers can easily communicate with dispatchers to discuss delivery schedules and courses of action should there be mechanical problems. For instance, automated dispatch systems help dispatchers locate the closest driver to a customer in order to maximize efficiency and quality of service. When threatened with crime or violence, drivers may have special "trouble lights" to alert authorities of emergencies and guarantee that help arrives quickly.

Taxi drivers and chauffeurs meet many different types of people. Dealing with rude customers and waiting for passengers requires patience. Many municipalities and taxicab and chauffeur companies require taxi drivers to wear clean and neat clothes. Many chauffeurs wear formal attire such as a tuxedo, a coat and tie, a dress, or a uniform and cap.

Employment

Taxi drivers and chauffeurs held about 176,000 jobs in 2000. Almost one-third worked for local and suburban passenger transportation and taxicab companies. Others worked for service oriented companies such as automotive dealers, automotive rental agencies, hotels, healthcare facilities, and social services agencies. About 27 percent were self-employed.

Training, Other Qualifications, and Advancement

Local governments set license standards and requirements for taxi drivers and chauffeurs that include minimum qualifications for driving experience and training. Many taxi and limousine companies set higher standards than required by law. It is common for companies to review applicants' medical, credit, criminal, and driving records. In addition, many companies require a higher minimum age and prefer that drivers be high school graduates.

Persons interested in driving a limousine or taxicab must first have a regular automobile driver's license. They also must acquire a chauffeur or taxi driver's license, commonly called a "hack" license. Local authorities generally require applicants for a hack license to pass a written exam or complete a training program that may include up to 80 hours of classroom instruction. To qualify through either an exam or a training program, applicants must know local geography, motor vehicle laws, safe driving practices, regulations governing taxicabs, and display some aptitude for customer service. Many training programs include a test on English proficiency, usually in the form of listening comprehension; applicants who do not pass the English exam must take an English course along with the formal driving program. In addition, some classroom instruction includes route management, map reading, and service for passengers with disabilities. Many taxicab or limousine companies sponsor applicants and give them a temporary permit that allows them to drive, although they may not yet have finished the training program or passed the test. However, some jurisdictions, such as New York City, have discontinued this practice and now require driver applicants to complete the licensing process before operating a taxi or limousine.

Some taxi and limousine companies give new drivers on-the-job training. They show drivers how to operate the taximeter and communications equipment, and how to complete paperwork. Other topics covered may include driver safety and popular sightseeing and entertainment destinations. Many companies have contracts with social service agencies and transportation services to transport elderly and disabled citizens in non-emergency situations. To support these services, new drivers may get special training on how to handle wheelchair lifts and other mechanical devices.

Taxi drivers and chauffeurs should be able to get along with many different types of people. They must be patient when waiting for passengers or when dealing with rude customers. It is also helpful for drivers to be tolerant and have even tempers when driving in heavy and congested traffic. Drivers should be dependable because passengers rely on them to be picked up at a prearranged time and taken to the correct destination. To be successful, drivers must be responsible and self-motivated because they work with little supervision. Increasingly, companies encourage drivers to develop their own loyal customer base to improve their businesses.

The majority of taxi drivers and chauffeurs are called "lease drivers." Lease drivers pay a daily, weekly, or monthly fee to the company allowing them to lease their vehicle. In the case of limousines, leasing also allows the driver access to the company's dispatch system. The fee may also include a charge for vehicle maintenance, insurance, and a deposit on the vehicle. Lease drivers may take their cars home with them when they are not on duty.

Opportunities for advancement are limited for taxi drivers and chauffeurs. Experienced drivers may obtain preferred routes or shifts. Some advance to dispatcher or manager jobs; others may start their own limousine company. On the other hand, many drivers like the independent, unsupervised work of driving their automobile.

In small and medium-size communities, drivers are sometimes able to buy their taxi, limousine, or other type of automobile and go into business for themselves. These independent owner-drivers require an additional permit allowing them to operate their vehicle as a company. Some big cities limit the number of operating permits. In these cities, drivers become owner-drivers by buying permits from owner-drivers who leave the business. Although many owner-drivers are successful, some fail to cover expenses and eventually lose their permit and automobile. Good business sense and courses in accounting, business, and business arithmetic can help an owner-driver become successful. Knowledge of mechanics enables owner-drivers to perform routine maintenance and minor repairs to cut expenses.

Job Outlook

Persons seeking jobs as taxi drivers and chauffeurs should encounter good opportunities. Many job openings will occur each year as drivers transfer to other occupations or leave the labor force. However, opportunities for drivers vary greatly in terms of earnings, work hours, and working conditions, depending on economic and regulatory conditions. Opportunities should be best for persons with good driving records and the ability to work flexible schedules.

Employment of taxi drivers and chauffeurs is expected to grow faster than the average for all occupations through the year 2010, as local and suburban travel increases with population growth. Employment growth will also stem from Federal legislation requiring increased services for persons with disabilities. Opportunities should be best in rapidly growing metropolitan areas.

Job opportunities can fluctuate from season to season and from month to month. Extra drivers may be hired during holiday seasons and peak travel and tourist times. During economic slowdowns, drivers are seldom laid off but they may have to increase their working hours, and earnings may decline somewhat. In economic upturns, job openings are numerous as drivers leave the occupation for other opportunities.

Earnings

Earnings of taxi drivers and chauffeurs vary greatly, depending on the number of hours worked, customers' tips, and other factors. Median hourly earnings of salaried taxi drivers and chauffeurs, including tips, were $8.19 in 2000. The middle 50 percent earned between $6.68 and $10.46 an hour. The lowest 10 percent earned less than $5.86, and the highest 10 percent earned more than $13.47 an hour. Median hourly earnings in the industries employing the largest numbers of taxi drivers and chauffeurs in 2000 were as follows:

Local and suburban transportation	$8.58
Taxicabs	8.34
Automotive rentals, no drivers	7.93
Hotels and motels	7.51
Personnel supply services	6.63

According to limited information available, the majority of self-employed taxi owner-drivers earned from about $20,000 to $30,000 annually, including tips. However, professional drivers with a regular clientele often earn more. Many chauffeurs who worked full time earned from about $25,000 to $50,000, including tips. Earnings were generally higher in urban areas.

Related Occupations

Other workers who have similar jobs include ambulance drivers, except emergency medical technicians; busdrivers; and truckdrivers and driver/sales workers.

Sources of Additional Information

Information on licensing and registration of taxi drivers and chauffeurs is available from offices of local governments regulating taxicabs. For information about work opportunities as a taxi driver or chauffeur, contact local taxi or limousine companies or State employment service offices.

For general information about the work of taxi drivers and the taxi industry, contact:

➤ Taxi, Limousine, and Paratransit Association, 3849 Farragut Ave., Kensington, MD 20895.

For general information about the work of limousine drivers, contact:

➤ National Limousine Association, 2365 Harrodsburg Rd., Suite A325, Lexington, KY 40504. Telephone (tollfree): 800-652-7007.

Truckdrivers and Driver/Sales Workers

(O*NET 53-3031.00, 53-3032.01, 53-3032.02, 53-3033.00)

Significant Points

- Opportunities should be good, because this occupation has among the greatest number of job openings each year.
- Competition is expected for jobs offering the highest earnings or most favorable work schedules.
- A commercial driver's license is required to operate most larger trucks.

Nature of the Work

Truckdrivers are a constant presence on the Nation's highways and interstates, delivering everything from automobiles to canned foods. Firms of all kinds rely on trucks for pickup and delivery of goods because no other form of transportation can deliver goods from doorstep to doorstep. Even if goods travel in part by ship, train, or airplane, trucks carry nearly all goods at some point in their journey from producer to consumer.

Before leaving the terminal or warehouse, truckdrivers check the fuel level and oil in their trucks. They also inspect the trucks to make sure the brakes, windshield wipers, and lights are working and that a fire extinguisher, flares, and other safety equipment are aboard and in working order. Drivers make sure their cargo is secure and adjust their mirrors so that both sides of the truck are visible from the driver's seat. Drivers report equipment that is inoperable, missing, or loaded improperly to the dispatcher.

Once under way, drivers must be alert to prevent accidents. Drivers can see farther down the road, because large tractor-trailers sit higher than cars, pickups, and vans. This allows drivers to seek traffic lanes that allow for a steady speed, while keeping sight of varying road conditions.

The length of deliveries varies according to the type of merchandise and its final destination. Local drivers may provide daily service for a specific route, while other drivers make intercity and interstate deliveries that take longer and may vary from job to job. The driver's responsibilities and assignments change according to the time spent on the road, the type of payloads transported, and vehicle size.

Heavy truck and tractor-trailer drivers drive trucks or vans with a capacity of at least 26,000 Gross Vehicle Weight (GVW). They transport goods including cars, livestock, and other materials in liquid, loose, or packaged form. Many routes are from city to city and cover long distances. Some companies use two drivers on very long runs—one drives while the other sleeps in a berth behind the cab. "Sleeper" runs may last for days, or even weeks, usually with the truck stopping only for fuel, food, loading, and unloading.

Some heavy truck and tractor-trailer drivers who have regular runs transport freight to the same city on a regular basis. Other drivers perform unscheduled runs because shippers request varying service to different cities every day. Dispatchers tell these drivers when to report for work and where to haul the freight. Increasingly, trucking companies use automated routing equipment to track goods during shipment.

After these truckdrivers reach their destination or complete their operating shift, the U.S. Department of Transportation requires that they complete reports detailing the trip, the condition of the truck, and the circumstances of any accidents. In addition, Federal regulations require employers to subject drivers to random alcohol and drug tests while they are on duty.

Long-distance heavy truck and tractor-trailer drivers spend most of their working time behind the wheel, but may load or unload their cargo after arriving at the final destination. This is especially common when drivers haul specialty cargo, because they may be the only one at the destination familiar with procedures or certified to handle the materials. Auto-transport drivers, for example, drive and position cars on the trailers and head ramps at the manufacturing plant and remove them at the dealerships. When picking up or delivering furniture, drivers of long-distance moving vans hire local workers to help them load or unload.

Light or delivery services truckdrivers drive trucks or vans with a capacity under 26,000 GVW. They deliver or pick up merchandise and packages within a specific area. This may include short "turnarounds" to deliver a shipment to a nearby city, pick up another loaded truck or van, and drive it back to their home base the same day. These services may require use of delivery tracking or location software to track the whereabouts of the merchandise or packages. Light or delivery services truckdrivers usually load or unload the merchandise at the customer's place of business. They may have helpers if there are many deliveries to make during the day, or if the load requires heavy moving. Typically, before the driver arrives for work, material handlers load the trucks and arrange items in order of delivery to minimize handling of the merchandise.

Firms of all kinds rely on trucks for pickup and delivery of goods.

Customers must sign receipts for goods and pay drivers the balance due on the merchandise if there is a cash-on-delivery arrangement. At the end of the day, drivers turn in receipts, money, records of deliveries made, and any reports on mechanical problems with their trucks.

Some local truckdrivers have sales and customer service responsibilities. The primary responsibility of *driver/sales workers*, or *route drivers*, is to deliver and sell their firm's products over established routes or within an established territory. They sell goods such as food products, including restaurant takeout items, or pick up and deliver items such as laundry. Their response to customer complaints and requests can make the difference between a large order and a lost customer. Route drivers may also take orders and collect payments.

The duties of driver/sales workers vary according to their industry, the policies of their particular company, and the emphasis placed on their sales responsibility. Most have wholesale routes that deliver to businesses and stores, rather than to homes. For example, wholesale bakery driver/sales workers deliver and arrange bread, cakes, rolls, and other baked goods on display racks in grocery stores. They estimate the amount and variety of baked goods to stock by paying close attention to the items that sell well and to those left sitting on the shelves. They may recommend changes in a store's order or encourage the manager to stock new bakery products. Driver/sales workers employed by laundries that rent linens, towels, work clothes, and other items visit businesses regularly to replace soiled laundry. From time to time, they solicit new orders from businesses along their route.

After completing their route, driver/sales workers order items for the next delivery based on product sales trends, weather, and customer requests.

Working Conditions

Truckdriving has become less physically demanding because most trucks now have more comfortable seats, better ventilation, and improved, ergonomically designed cabs. Although these changes make the work environment more attractive, driving for many hours at a stretch, unloading cargo, and making many deliveries can be tiring. Local truckdrivers, unlike long-distance drivers, usually return home in the evening. Some self-employed long-distance truckdrivers who own and operate their trucks spend most of the year away from home.

Design improvements in newer trucks reduce stress and increase the efficiency of long-distance drivers. Many of the newer trucks

are virtual miniapartments on wheels, equipped with refrigerators, televisions, and bunks. Satellites and Global Positioning Systems (GPS) link many of these state-of-the-art vehicles with company headquarters. Troubleshooting information, directions, weather reports, and other important communications can be delivered to the truck anywhere in the country within seconds. Drivers can easily communicate with the dispatcher to discuss delivery schedules and courses of action in the event of mechanical problems. The satellite linkup also allows the dispatcher to track the truck's location, fuel consumption, and engine performance.

Many drivers must also work with computerized inventory tracking equipment. It is important for the producer, warehouse, and customer to know the product's location at all times, in order to keep costs low and the quality of service high. For example, voice recognition software has replaced bar code readers in some freezer and refrigerator trucks, reducing error rates and improving function in cold conditions. Drivers must be able to adapt to an increasingly technology-driven workplace.

The U.S. Department of Transportation governs work hours and other working conditions of truckdrivers engaged in interstate commerce. A long-distance driver cannot work more than 60 hours in any 7-day period. Federal regulations also require that truckers rest 8 hours for every 10 hours of driving. Many drivers, particularly on long runs, work close to the maximum time permitted because they typically are compensated according to the number of miles or hours they drive. Drivers on long runs may face boredom, loneliness, and fatigue. Drivers frequently travel at night, on holidays, and weekends to avoid traffic delays and deliver cargo on time.

Local truckdrivers frequently work 50 or more hours a week. Drivers who handle food for chain grocery stores, produce markets, or bakeries typically work long hours, starting late at night or early in the morning. Although most drivers have regular routes, some have different routes each day. Many local truckdrivers, particularly driver/sales workers, load and unload their own trucks. This requires considerable lifting, carrying, and walking each day.

Employment

Truckdrivers and driver/sales workers held about 3.3 million jobs in 2000. Most truckdrivers find employment in large metropolitan areas along major interstate roadways where major trucking, retail, and wholesale companies have distribution outlets. Some drivers work in rural areas, providing specialized services such as delivering newspapers to customers or coal to a railroad.

Trucking companies employed about 28 percent of all truckdrivers in the United States. Almost 32 percent worked for companies engaged in wholesale or retail trade, such as auto parts stores, oil companies, lumber yards, restaurants, or distributors of food and grocery products. The remaining truckdrivers were distributed across many industries, including construction, manufacturing, and services.

Fewer than 1 out of 10 truckdrivers were self-employed. Of these, a significant number were owner-operators who either served a variety of businesses independently or leased their services and trucks to a trucking company.

Training, Other Qualifications, and Advancement

State and Federal regulations govern the qualifications and standards for truckdrivers. All drivers must comply with Federal regulations and any State regulations that are stricter than Federal requirements. Truckdrivers must have a driver's license issued by the State in which they live, and most employers require a clean driving record. Drivers of trucks designed to carry at least 26,000 pounds—including most tractor-trailers, as well as bigger straight trucks—must obtain a commercial driver's license (CDL) from the State in which they live. All truckdrivers who operate trucks transporting hazardous materials must obtain a CDL, regardless of truck size. Federal regulations governing the CDL exempt certain groups, including farmers, emergency medical technicians, firefighters, some military drivers, and snow and ice removers. In many States, a regular driver's license is sufficient for driving light trucks and vans.

To qualify for a commercial driver's license, applicants must pass a written test on rules and regulations, and then demonstrate that they can operate a commercial truck safely. A national databank permanently records all driving violations incurred by persons who hold commercial licenses. A State will check these records and deny a commercial driver's license to a driver who already has a license suspended or revoked in another State. Licensed drivers must accompany trainees until the trainees get their own CDL. Information on how to apply for a commercial driver's license may be obtained from State motor vehicle administrations.

While many States allow those who are at least 18 years old to drive trucks within State borders, the U.S. Department of Transportation establishes minimum qualifications for truckdrivers engaged in interstate commerce. Federal Motor Carrier Safety Regulations require drivers to be at least 21 years old and to pass a physical examination once every 2 years. The main physical requirements include good hearing, at least 20/40 vision with glasses or corrective lenses, and a 70-degree field of vision in each eye. Drivers can not be colorblind. Drivers must be able to hear a forced whisper in one ear at not less than 5 feet, with a hearing aide if needed. Drivers must have normal use of arms and legs and normal blood pressure. Drivers can not use any controlled substances, unless prescribed by a licensed physician. Persons with epilepsy or diabetes controlled by insulin are not permitted to be interstate truckdrivers. Federal regulations also require employers to test their drivers for alcohol and drug use as a condition of employment, and require periodic random tests of the drivers while they are on duty. In addition, a driver must not have been convicted of a felony involving the use of a motor vehicle; a crime using drugs; driving under the influence of drugs or alcohol; or hit-and-run driving that resulted in injury or death. All drivers must be able to read and speak English well enough to read road signs, prepare reports, and communicate with law enforcement officers and the public. Also, drivers must take a written examination on the Motor Carrier Safety Regulations of the U.S. Department of Transportation.

Many trucking operations have higher standards than those described. Many firms require that drivers be at least 22 years old, be able to lift heavy objects, and have driven trucks for 3 to 5 years. Many prefer to hire high school graduates and require annual physical examinations. Companies have an economic incentive to hire less-risky drivers because good drivers can increase fuel economy with their driving skills and decrease liability costs for the company.

Taking driver-training courses is a desirable method of preparing for truckdriving jobs and for obtaining a commercial driver's license. High school courses in driver-training and automotive mechanics also may be helpful. Many private and public vocational-technical schools offer tractor-trailer driver training programs. Students learn to maneuver large vehicles on crowded streets and in highway traffic. They also learn to inspect trucks and freight for compliance with Federal, State, and local regulations. Some programs provide only a limited amount of actual driving experience, and completion of a program does not guarantee a job. Persons interested in attending a driving school should check with local trucking companies to make sure the school's training is acceptable.

Some States require prospective drivers to complete a training course in basic truckdriving before being issued their CDL. In Maine, for example, prospective applicants must complete an 8-week course at a school certified by the Professional Truck Drivers

Institute (PTDI). PTDI-certified schools provide training that meets Federal Highway Administration guidelines for training tractor-trailer drivers.

Drivers must get along well with people because they often deal directly with customers. Employers seek driver/sales workers who speak well and have self-confidence, initiative, tact, and a neat appearance. Employers also look for responsible, self-motivated individuals able to work with little supervision.

Training given to new drivers by employers is usually informal, and may consist of only a few hours of instruction from an experienced driver, sometimes on the new employee's own time. New drivers may also ride with and observe experienced drivers before assignment of their own runs. Drivers receive additional training to drive special types of trucks or handle hazardous materials. Some companies give 1 to 2 days of classroom instruction covering general duties, the operation and loading of a truck, company policies, and the preparation of delivery forms and company records. Driver/sales workers also receive training on the various types of products they carry, so that they will be effective sales workers.

Very few people enter truckdriving professions directly out of school; most truckdrivers previously held jobs in other occupations. Driving experience in the Armed Forces can be an asset. In some cases, a person may also start as a truckdriver's helper, driving part of the day and helping to load and unload freight. Senior helpers receive promotion when driving vacancies occur.

Although most new truckdrivers are assigned immediately to regular driving jobs, some start as extra drivers, substituting for regular drivers who are ill or on vacation. They receive a regular assignment when an opening occurs.

New drivers sometimes start on panel trucks or other small straight trucks. As they gain experience and show competent driving skills, they may advance to larger and heavier trucks, and finally to tractor-trailers.

Advancement of truckdrivers generally is limited to driving runs that provide increased earnings or preferred schedules and working conditions. For the most part, a local truckdriver may advance to driving heavy or special types of trucks, or transfer to long-distance truckdriving. Working for companies that also employ long-distance drivers is the best way to advance to these positions. A few truckdrivers may advance to dispatcher, manager, or traffic work—for example, planning delivery schedules.

Some long-distance truckdrivers purchase a truck and go into business for themselves. Although many of these owner-operators are successful, some fail to cover expenses and eventually go out of business. Owner-operators should have good business sense as well as truckdriving experience. Courses in accounting, business, and business mathematics are helpful, and knowledge of truck mechanics can enable owner-operators to perform their own routine maintenance and minor repairs.

Job Outlook

Opportunities should be favorable for persons interested in truckdriving. This occupation has among the largest number of job openings each year. Although growth in demand for truckdrivers will create thousands of openings, many openings also will occur as experienced drivers transfer to other fields of work, retire, or leave the labor force for other reasons. Jobs vary greatly in terms of earnings, weekly work hours, number of nights spent on the road, and quality of equipment operated. Competition is expected for jobs with the most attractive earnings and working conditions, because truckdriving does not require education beyond high school.

Employment of truckdrivers is expected to increase about as fast as the average for all occupations through the year 2010, as the economy grows and the amount of freight carried by truck increases. The increased use of rail, air, and ship transportation requires truckdrivers to pick up and deliver shipments. Growth in the number of long-distance drivers will remain strong because these drivers transport perishable and time-sensitive goods more efficiently than do alternative modes of transportation, such as railroads.

Average growth of light and heavy truck driver employment will outweigh slow growth in driver/sales worker jobs. The number of truckdrivers with sales responsibilities is expected to increase more slowly than the average for all other occupations because companies are increasingly shifting sales, ordering, and customer service tasks to sales and office staffs, and using regular truckdrivers to make deliveries to customers.

Job opportunities may vary from year to year, because the strength of the economy dictates the amount of freight moved by trucks. Companies tend to hire more drivers when the economy is strong and deliveries are in high demand. Consequently, when the economy slows, employers hire fewer drivers, or even lay off drivers. Independent owner-operators are particularly vulnerable to slowdowns. Industries least likely to be affected by economic fluctuation tend to be the most stable places for employment.

Earnings

Median hourly earnings of heavy truck and tractor-trailer drivers were $15.25 in 2000. The middle 50 percent earned between $11.97 and $19.12 an hour. The lowest 10 percent earned less than $9.58, and the highest 10 percent earned more than $22.50 an hour. Median hourly earnings in the industries employing the largest numbers of heavy truck and tractor-trailer drivers in 2000 were as follows:

Trucking and courier services, except air	$16.35
Personnel supply services	15.93
Groceries and related products	15.39
Miscellaneous special trade contractors	13.50
Concrete, gypsum, and plaster products	13.22

Median hourly earnings of light or delivery services truckdrivers were $10.74 in 2000. The middle 50 percent earned between $8.19 and $14.48 an hour. The lowest 10 percent earned less than $6.57, and the highest 10 percent earned more than $19.25 an hour. Median hourly earnings in the industries employing the largest numbers of light or delivery services truckdrivers in 2000 were as follows:

Air transportation, scheduled	$16.61
Trucking and courier services, except air	12.60
Groceries and related products	11.34
Motor vehicles, parts, and supplies	8.19
Eating and drinking places	6.56

Median hourly earnings of driver/sales workers, including commission, were $9.79 in 2000. The middle 50 percent earned between $6.70 and $14.28 an hour. The lowest 10 percent earned less than $5.88, and the highest 10 percent earned more than $18.77 an hour. Median hourly earnings in the industries employing the largest numbers of driver/sales workers in 2000 were as follows:

Beer, wine, and distilled beverages	$14.49
Laundry, cleaning, and garment services	13.79
Groceries and related products	12.27
Nonstore retailers	11.05
Eating and drinking places	6.41

As a general rule, local truckdrivers receive an hourly wage and extra pay for working overtime, usually after 40 hours. Employers pay long-distance drivers primarily by the mile. Their rate per mile can vary greatly from employer to employer and may even depend on the type of cargo. Typically, earnings increase with mileage

driven, seniority, and the size and type of truck driven. Most driver/sales workers receive a commission based on their sales in addition to an hourly wage.

Most self-employed truckdrivers are primarily engaged in long-distance hauling. After deducting their living expenses and the costs associated with operating their trucks, they commonly have earnings of $20,000 to $25,000 a year.

Many truckdrivers are members of the International Brotherhood of Teamsters. Some truckdrivers employed by companies outside the trucking industry are members of unions representing the plant workers of the companies for which they work.

Related Occupations

Other driving occupations include ambulance drivers and attendants, except emergency medical technicians; busdrivers; and taxi drivers and chauffeurs.

Sources of Additional Information

Information on truckdriver employment opportunities is available from local trucking companies and local offices of the State employment service.

Information on career opportunities in truckdriving may be obtained from:

➤ American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314. Internet: **http://www.truckline.com**

➤ American Trucking Association Foundation, 2200 Mill Rd., Alexandria, VA 22314.

The Professional Truck Driver Institute, a nonprofit organization established by the trucking industry, manufacturers, and others, certifies truckdriver training courses meeting industry standards. A free list of certified tractor-trailer driver training courses may be obtained from:

➤ Professional Truck Driver Institute, 2200 Mill Rd., Alexandria, VA 22314. Internet: **http://www.ptdi.org**

Water Transportation Occupations

(O*NET 53-5011.01, 53-5011.02, 53-5021.01, 53-5021.02, 53-5021.03, 53-5022.00, 53-5031.00)

Significant Points

- Many jobs in water transportation occupations require a merchant mariner's document or a license from the U.S. Coast Guard.
- Merchant mariners on ocean-going ships are hired for periods ranging from a single voyage to several continuous voyages and may be away from home continuously for months.
- Jobs aboard ocean-going vessels have high pay but competition for them remains keen, and merchant mariners might have to wait months between work opportunities.

Nature of the Work

Movement of huge amounts of cargo, as well as passengers, between nations and within our nation depends on workers in water transportation occupations. They operate and maintain deep-sea merchant ships, tugboats, towboats, ferries, dredges, excursion vessels, and other waterborne craft on the oceans, the Great Lakes, rivers and canals, other waterways, and in harbors. (Workers who operate watercraft used in commercial fishing are described in the section on fishers and fishing vessel operators elsewhere in the *Handbook*.)

Captain, mates, and pilots of water vessels command or supervise the operations of ships and water vessels, both within domestic waterways and on the deep sea. *Captains* or *masters* are in overall command of the operation of a vessel, and they supervise the work of any other officers and crew. They determine the course and speed, maneuver to avoid hazards, and continuously monitor the vessel's position using charts and navigational aides. Captains either direct or oversee crew members who steer the vessel, determine its location, operate engines, communicate to other vessels, perform maintenance, handle lines, or operate vessel equipment. Captains and their department heads ensure that proper procedures and safety practices are followed, check that machinery and equipment are in good working order, and oversee the loading and discharging of cargo or passengers. They also maintain logs and other records tracking the ships' movements, efforts at controlling pollution, and cargo/passenger carrying records.

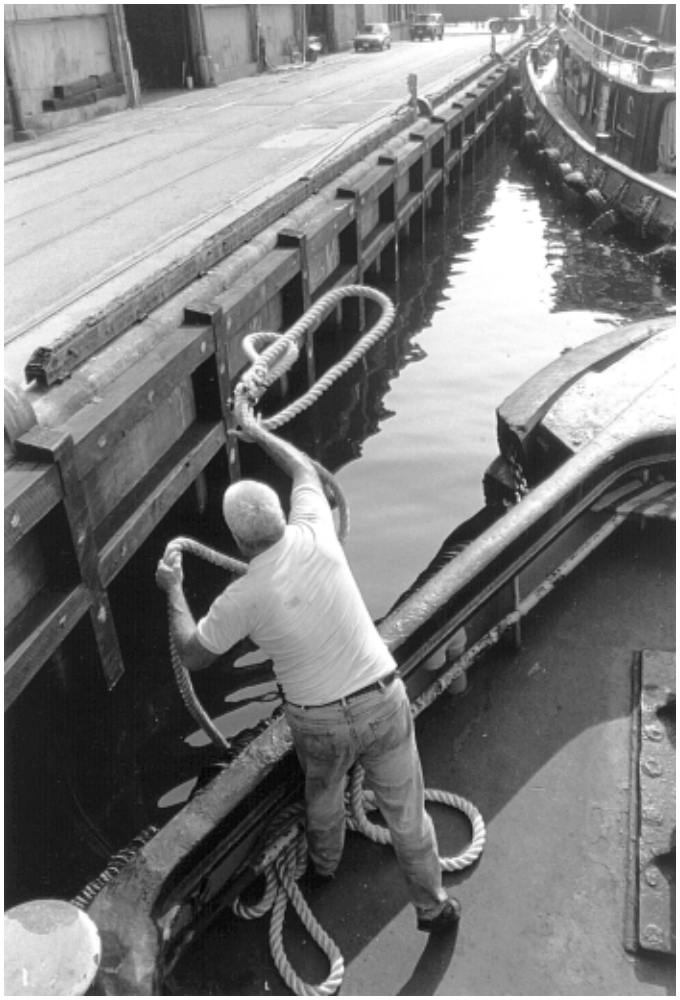
Deck officers or *mates* perform the work for captains on vessels when they are on watch. Mates also supervise and coordinate activities of the crew aboard the ship. They inspect the cargo holds during loading to ensure the load is stowed according to specifications and regulations. Mates supervise crew members engaged in maintenance and the primary up-keep of the vessel. All mates stand watch for specified periods, usually 4 hours on and 8 hours off. However, on smaller vessels, there may be only one mate (called a *pilot* on some inland towing vessels) who alternates watches with the captain. The mate would assume command of the ship if the captain became incapacitated. When more than one mate is necessary aboard a ship, they typically are designated Chief Mate or First Mate, Second Mate, and Third Mate.

Pilots guide ships in and out of harbors, through straits, and on rivers and other confined waterways where a familiarity with local water depths, winds, tides, currents, and hazards such as reefs and shoals are of prime importance. Pilots on river and canal vessels are usually regular crew members, like mates. Harbor pilots are generally independent contractors, who accompany vessels while they enter or leave port. They may pilot many ships in a single day. *Motorboat operators* operate small, motor-driven boats to carry passengers and freight. They also take depth soundings in turning basins, and serve as liaisons between ships, between ship and shore, harbor and beach, or area patrol.

Ship engineers operate, maintain, and repair propulsion engines, boilers, generators, pumps, and other machinery. Merchant marine vessels usually have four engineering officers: A chief engineer, and a first, second, and third assistant engineer. Assistant engineers stand periodic watches, overseeing the safe operation of engines and machinery.

Marine oilers and more experienced *qualified members of the engine department*, or QMEDs, maintain the proper running order of their vessels in the engine spaces below decks under the direction of the ship's engineering officers. They lubricate gears, shafts, bearings, and other moving parts of engines and motors; read pressure and temperature gauges and record data; and may assist with repairs and adjust machinery.

Sailors operate the vessel and its deck equipment under the direction of the ship's officers, and keep the nonengineering areas in good condition. They stand watch, looking out for other vessels and obstructions in the ship's path and navigational aids such as buoys and lighthouses. They also steer the ship, measure water depth in shallow water, and maintain and operate deck equipment such as lifeboats, anchors, and cargo-handling gear. On vessels handling liquid cargo, sailors hook up hoses, operate pumps, and clean tanks, while on tugboats or tow vessels, they tie barges together



Seamen handle lines when docking in or departing from port.

into tow units, inspect them periodically, and disconnect them when the destination is reached. When docking or departing, they handle lines. They also perform routine maintenance chores such as repairing lines, chipping rust, and painting and cleaning decks or other areas. Experienced sailors are designated *able seamen* on ocean-going vessels, but may just be called deckhands on inland waters; larger vessels usually have a *boatswain*, or head seaman.

A typical deep-sea merchant ship has a captain, three deck officers or mates, a chief engineer and three assistant engineers, a radio operator, plus six or more nonofficers, such as deck seamen, oilers and QMEDs, and cooks or foodhandlers. The size and service of the ship determine the number of crew for a particular voyage. Small vessels operating in harbors, rivers, or along the coast may have a crew comprised only of a captain and one deckhand. The cooking responsibilities usually fall under the deckhands' duties.

On larger coastal ships, the crew may include a captain, a mate or pilot, an engineer, and seven or eight seamen. Non-licensed positions on a large ship may include a full-time cook, an electrician, and machinery mechanics. On cruise ships, which also may be considered coastal ships, *bedroom stewards* keep passengers' quarters clean and comfortable.

Working Conditions

Merchant mariners spend extended periods at sea. Most deep-sea mariners are hired for one or more voyages that last for several months, although there is no job security after that voyage. Many are unemployed for weeks or months before they have another opportunity to join another ship's crew.

The rate of unionization for these workers is almost 75 percent, much higher than the average for all occupations. Consequently, merchant marine officers and seamen, both veterans and beginners, are hired for voyages through union hiring halls or directly by shipping companies. Hiring halls prioritize the candidates by the length of time the person has been out of work, and fill open slots accordingly. Hiring halls are typically found in major seaports.

At sea, these workers usually stand watch for 4 hours and are off for 8 hours, 7 days a week. Those employed on Great Lakes ships work 60 days and have 30 days off, but do not work in the winter when the lakes are frozen. Workers on rivers, canals, and in harbors are more likely to have year-round work. Some work 8- or 12-hour shifts and go home every day. Others work steadily for a week or month and then have an extended period off. When working, they are usually on duty for 6 or 12 hours and are off for 6 or 12 hours. Those on smaller vessels are normally assigned to one vessel and have steady employment.

People in water transportation occupations work in all weather conditions. Although merchant mariners try to avoid severe storms while at sea, working in damp and cold conditions is often inevitable. While it is uncommon nowadays for vessels to suffer sea disasters such as fire, explosion, or a sinking, workers face the possibility that they may have to abandon their craft on short notice if it collides with other vessels or runs aground. They also risk injury or death from falling overboard, and hazards associated with working with machinery, heavy loads, and dangerous cargo.

Most newer vessels are air-conditioned, soundproofed from noisy machinery, and equipped with comfortable living quarters. Nevertheless, some mariners dislike the long periods away from home and the confinement aboard ship, and consequently leave the industry.

Employment

Water transportation workers held about 70,000 jobs in 2000. The total number who worked at some point in the year was somewhat higher because many merchant marine officers and seamen worked only part of the year. The following tabulation shows employment in the occupations that make up this group:

Sailors and marine oilers	32,000
Ship and boat captains and operators	25,000
Ship engineers	8,600
All other water transportation workers	4,900

More than 75 percent of these workers were employed in water transportation services. Of these, about 39 percent worked in establishments related to marine cargo handling, towing and tugboat services, marinas, or boat cleaning and marine salvaging. About 25 percent worked in the transportation of freight on the oceans or the Great Lakes, while about 13 percent were employed in the water transportation of passengers on the deep seas, ferries, or sightseeing boats. The Federal government employed approximately 10 percent of all water transportation workers.

Training and Other Qualifications

Entry, training, and educational requirements for most water transportation occupations are established and regulated by the U.S. Coast Guard, an agency of the U.S. Department of Transportation. All officers and operators of watercraft must be licensed by the Coast Guard, which offers various kinds of licenses, depending on the position and type of craft.

There are two ways to qualify for a deck or engineering officer's license: Applicants either must accumulate sea time and meet

regulatory requirements, or must graduate from the U.S. Merchant Marine Academy or one of the six State maritime academies. In both cases, applicants must pass a written examination. Federal regulations also require that an applicant pass a physical examination, a drug screening, and a National Driver Register Check before being considered. Persons without formal training can be licensed if they pass the written exam and possess sea service appropriate to the license for which they are applying. However, it is difficult to pass the examination without substantial formal schooling or independent study. Also, because seamen may work 6 months a year or less, it can take 5 to 8 years to accumulate the necessary experience. The academies offer a 4-year academic program leading to a bachelor of science degree, a license as a third mate (deck officer) or third assistant engineer (engineering officer) issued by the Coast Guard, and, if the person is qualified, a commission as ensign in the U.S. Naval Reserve, Merchant Marine Reserve, or the Coast Guard Reserve. With experience and additional training, third officers may qualify for higher rank.

Sailors and unlicensed engineers working on U.S. flagged deep-sea and Great Lakes vessels must hold a Coast Guard-issued document. Additionally, they must hold certification when working aboard liquid-carrying vessels. Able seamen also must hold government-issued certification. For employment in the merchant marine as an unlicensed seaman, a merchant mariner's document issued by the Coast Guard is needed. Most of the jobs must be filled by U.S. citizens. However, a small percentage of applicants for merchant mariner documents do not need to be U.S. citizens, but must at least be aliens legally admitted into the United States and holding a green card. A medical certificate of excellent health attesting to vision, color perception, and general physical condition is required for higher level deckhands and unlicensed engineers. While no experience or formal schooling is required, training at a union-operated school is the best source. Beginners are classified as ordinary seamen and may be assigned to any of the three unlicensed departments: Deck, engine, or steward. With experience at sea, and perhaps union-sponsored training, an ordinary seaman can pass the able seaman exam and move up with 3 years of service.

No special training or experience is needed to become a seaman or deckhand on vessels operating in harbors or on rivers or other waterways. Newly hired workers are generally given a short introductory course and then learn skills on the job. After sufficient experience, they are eligible to take a Coast Guard exam to qualify as a mate, pilot, or captain. Substantial knowledge gained through experience, courses taught at approved schools, and independent study are needed to pass the exam.

Harbor pilot training is usually an extended apprenticeship with a towing company or a pilot association. Entrants may be able seamen or licensed officers.

Job Outlook

Keen competition is expected to continue for jobs in water transportation occupations. Overall, employment in water transportation occupations is projected to grow more slowly than the average for all occupations through the year 2010. Opportunities will vary by sector.

Employment in deep-sea shipping for American mariners is expected to stabilize after several years of decline. New international regulations have raised shipping standards with respect to safety, training, and working conditions. Consequently, competition from ships that sail under foreign *flags of convenience* (FOCs) should lessen as insurance rates rise for ships that do not meet the new standards. Insuring ships under industrialized countries' flags, including that of the United States, should become less expensive, increasing the amount of international cargo carried by U.S. ships. A fleet of deep-sea U.S. flagged ships is considered to be vital to the Nation's defense, so some receive Federal support through a maritime security subsidy and other provisions in laws limit certain Federal cargoes to ships that fly the U.S. flag.

Newer ships are designed to be operated safely by much smaller crews. Innovations include automated controls and computerized monitoring systems in navigation, engine control, watchkeeping, ship management, and cargo handling. As older vessels are replaced, computer skills will become more important for crews. Possible future developments include "fast ships," ocean-going cargo vessels that use jet propulsion, which would decrease ocean-crossing times significantly. If such plans are successful, the industry will benefit in terms of increased business and employment.

Vessels on rivers and canals and on the Great Lakes carry mostly bulk products such as coal, iron ore, petroleum, sand and gravel, grain, and chemicals. Though shipments of these products are expected to grow through the year 2010, current imports of steel are dampening employment on the Lakes. Employment in water transportation services is likely to rise, however.

Growth also is expected in the cruiseline industry within U.S. waters. Vessels that operate between U.S. ports are required by law to be U.S. flagged vessels. The building and staffing of several new cruise ships over the next 3 to 4 years will create new opportunities for employment at sea in the cruise line industry, which is composed mostly of foreign flagged ships.

Nevertheless, openings within the traditional water transportation sector for mariners, though expanding slightly, will remain tight. Some experienced merchant mariners may continue to go for periods of time without work. However, this situation appears to be changing, as the demand for licensed and non-licensed personnel has been on the rise. Maritime academy graduates who have not found licensed shipboard jobs in the U.S. merchant marine find jobs in related industries. Because they are commissioned as ensigns in the Naval or Coast Guard Reserve, some are selected for active duty in the Navy or Coast Guard. Some find jobs as seamen on U.S. flagged or foreign flagged vessels, tugboats, other watercraft, or enter civilian jobs with the U.S. Navy or Coast Guard. Some take land-based jobs with shipping companies, marine insurance companies, manufacturers of boilers or related machinery, or other related jobs.

Earnings

Earnings vary widely depending on the particular water transportation position and experience, ranging from the minimum wage in some beginning seamen or mate positions to more than $33.77 an hour for some experienced ship engineers. Median hourly earnings in 2000 of water transportation occupations were as follows:

Ship and boat captains and operators	$21.62
Ship engineers	22.85
Sailors and marine oilers	13.52
All other water transportation workers	11.70

Annual pay for captains of larger vessels, such as container ships, oil tankers, or passenger ships, may exceed $100,000, but only after many years of experience. Similarly, captains of tugboats often earn more than the median reported here, with earnings dependent on the port and the nature of the cargo.

Related Occupations

Workers in other occupations who make their living on the seas and coastal waters include fishers and fishing vessel operators and some members of branches of the armed forces.

Sources of Additional Information

Information on merchant marine careers, training, and licensing requirements is available from:

➤ Maritime Administration, U.S. Department of Transportation, 400 7th St. SW., Room 7302, Washington, DC 20590. Internet**: http://www.marad.dot.gov**

➤ Seafarers' International Union, 5201 Auth Way, Camp Springs, MD 20746.

➤ Paul Hall Center for Maritime Training and Education, P.O. Box 75, Piney Point, MD 20674-0075. Internet: **http://www.seafarers.org/phc**

➤ International Organization of Masters, Mates, and Pilots, 700 Maritime Boulevard, Linthicum Heights, MD 21090-1941.

➤ U.S. Coast Guard National Maritime Center, Licensing and Evaluation Branch, 4200 Wilson Blvd., Suite 630, Arlington, VA 22203-1804. Internet: **http://www.uscg.mil/stcw/m-pers.htm**

Individuals interested in attending the merchant marine academy should contact:

➤ Admissions Office, U.S. Merchant Marine Academy, Steamboat Rd., Kings Point, NY 11024-1699.